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Vol. CIII JULY 2, 1936 No. 1

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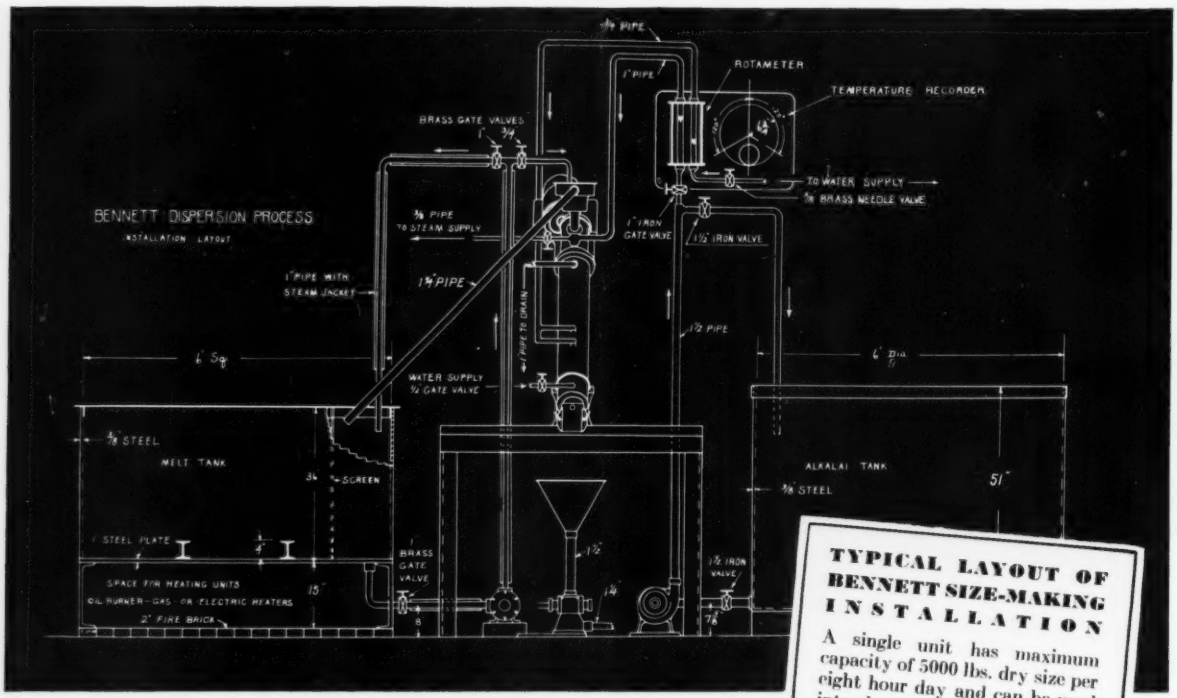

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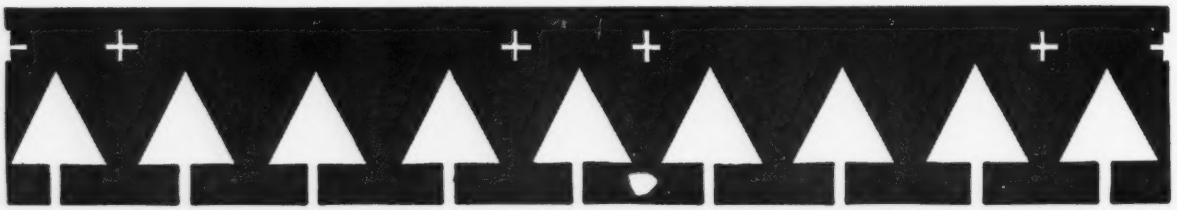

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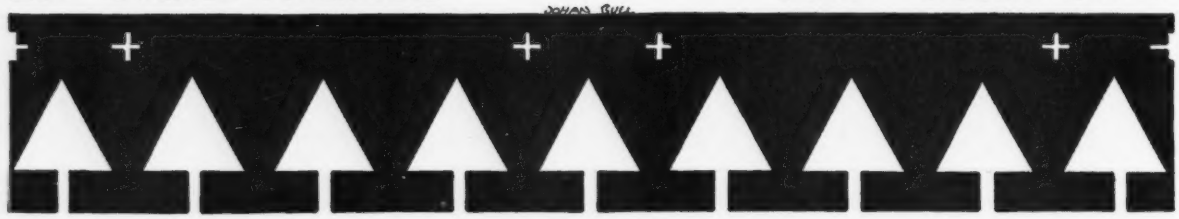

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Superintendents Hold Meeting at Grand Rapids

Seventeenth Annual Convention of the American Pulp and Paper Mill Superintendent's Association Is Splendid Success from View Point Both of Attendance and Educational Features—F. J. Timmerman New President

[FROM OUR SPECIAL REPRESENTATIVE]

GRAND RAPIDS, Mich., June 27, 1936—The Seventeenth annual convention and machinery exhibition of the American Pulp and Paper Mill Superintendents Association held here June 24-26, with headquarters at the Pantlind Hotel was a splendid success both as regards attendance and the many attractive convention features provided. The city of Grand Rapids is one of the most attractive in the Middle West. It is a city of many beautiful homes and many fine parks surrounded by lakes and streams. It is known far and wide as one of the largest furniture manufacturing centers in the world. It proved an ideal place for the convention.

Banquet Wednesday Evening

Wednesday which was a perfect day was devoted to registration and a get together at the Pantlind Hotel. Afterwards there was a golf tournament held at the beautiful Blythefield Country Club, where everyone enjoyed a wonderful time. That evening in the Civic Auditorium, a large banquet was held with the Hon. John Collins, mayor of East Grand Rapids as toastmaster. Francis D. Bowman, chairman of the entertainment committee presented Poole's Orchestra and Miss Audrey Ely and Wishart Campbell, well-known radio singer—who gave a very fine entertainment.

C. F. Sisson, chairman of the golf committee, presented the prizes won at the golf tournament held that afternoon. The winners were: Low gross—J. R. Simpson; honorable mention—W. K. Childs; low net—D. Patrick; blind bogey—C. E. Aull, S. I. Andrews, F. H. Knowlton, W. C. Campbell, Matt Ketter; least putts—S. I. Anderson, J. A. Foxgrover; second low putts—F. A. Knowlton; longest ball off No. 1—Mr. Kabel; nearest to pin on No. 11—A. T. Brainard· Second nearest—H. O. Bing; Most sixes—H. G. Potts; Most sevens—B. Currier; Most nines—R. W. Perkins; high gross—Tim Gillespie; high foursomes,—L. M. Hopkins (93), J. C. Dieffenderfer (127), R. M. Guie (138); W. G. Putnem (121); Most strokes on 16th—Frank Whittiger; Most balls in river, thirteenth hole—G. M. Markel (3), L. W. March (3), W. F. Phillips (3).

E. F. Zellers Opens Convention

Thursday morning one of the largest gatherings at any convention got down to the real business. The meeting called to order by E. F. Zellers in the Black and Silver Room of the Civic Auditorium. Rev. Thompson, D.D., gave the invocation. Owing to the absence from the city of Mayor Tunis Johnson, Henry W. Walstrom gave the address of welcome. Brydon D. Millidge, second vice-president, responded. Charles Champion, president of the Association then delivered his address as follows:—

Address of the President

I have been greatly honored by being chosen as president of your organization and have tried to fill this position to the best of my ability, but I have found that the duties necessary in connection with this organization and that of running a paper mill at one and the same time is an almost impossible job. In fact even to give the thought to the job that is required by the head of this organization is considerably more than, in my opinion, any one man can do and at the same time have the responsibility of the production of a pulp and paper mill.

Paper making has changed very considerably since the institution of the pulp and paper mill superintendent's association. Ten or fifteen years ago we had our ordinary stock of paper to make and shipments in many instances were made from finished stock held at the mill. In the last few years practically every order comes in with specifications entirely different from another order. In other words, the paper made today is made for the individual company and you might call it "tailor made". Thus, as stated above, the man who has charge of the production must give practically his undivided time to same.

Personally, I am very much interested in our association and feel that we hold a very important place in the manufacturing of paper. There is no question but what the members of our association have had opportunities to broaden out in knowledge and this must have reflected back on our organization.

For the past three years your board of trustees have considered very seriously how we can be of a greater benefit to the pulp and paper industry. Finally it was decided and voted at the last annual meeting in Richmond, Va., to employ an executive secretary to relieve the president and board of trustees and also the divisional officers

of some of the duties pertaining to the association and also to insure its members receiving better service than they have in the past.

This we have done in the appointment of George W. Craigie as field secretary. His undivided time and duties are devoted to the interest of the organization by supplying each individual with more information and helping with the development of the divisional organizations.

He has formulated a plan which has been practically accepted by your board of trustees which will give your members a much better service than we have had heretofore. His duties will be to attend and help to arrange the divisional meetings and also the national convention. He will have at his fingers' ends the latest specifications on pulp and paper making and also the latest apparatus connected with pulp and paper making. The individual members may apply to him at any time for information that he may require and that will be of benefit to him personally as well as to his employer.

I personally feel that this is a very important step in the right direction. I also feel quite certain that we have selected a man well adapted to the situation and I can almost assure that within two years managers of paper mills will have their superintendents and heads of different departments applying to our organization for membership.

You may say that we have a secretary and treasurer who should be able to fulfill the duties of our field secretary as well as his own work. To this I wish to say that our present secretary and treasurer is very efficient and has as much work or more than we could expect from any one man along the lines which have been his duties heretofore.

Right here I wish to say to you that I congratulate you on the selection of and the excellent duties you have had performed in your interest by your present secretary and treasurer, Robert Eminger. My work with him during this last year has been very pleasant. I have found him very efficient, very faithful and above all very honest in his duties.

I also wish to speak of the *Paper Mill and Wood Pulp News,* the official organ of our association. They deserve a very large portion of the success of this convention. I personally extend to them my heartfelt thanks for what they have done in this connection.

To the chairman of this convention committee, our Third Vice-President, Roy Zellers and his committee we

F. L. ZELLERS
Second Vice-President

owe a great amount of gratitude for arranging a most interesting convention and an exhibition which cannot help but give every pulp and paper mill man an opportunity to broaden out his idea of the latest machinery and apparatus which may be applied to his own individual mill.

It has been a pleasure to serve you as president and I wish to say that when my time expires I will still be very actively interested in the work of this wonderful organization and hope to continue with you for sometime.

Group Meetings

Following the address of Mr. Champion there was a potpourri of mill problems forum given by the Miami division. After luncheon there were the group meetings as follows: Soda and sulphate—C. E. Stoke, chairman; Sulphite Pulp—S. E. Tomczak, chairman; Ground Wood—Sidney B. Wells, chairman; Book, Bond Papers and Coating—J. H. Simpson, chairman; Tissue Group—H. H. Harrison, chairman. These meetings were well attended and many interesting papers were given. There was a large amount of discussion in each group.

In the evening, there was a joint dinner at the Civic Auditorium—Carroll F. Sweet, Federal Home Loan

FRANK J. TIMMERMAN
President

BRYDON D. MILLIDGE
First Vice-President

Administrator of Grand Rapids, was toastmaster—presenting Dr. Merton Rice of Detroit, who spoke on the subject, "My Country".

Friday morning the meeting was called to order by the president, Charles Champion, when Grover Keeth, Marathon Paper Mills Company, Rothschild, Wis., made a report of his trip to the National Safety Conference; and W. G. Schlicting, Claridge Fan Company, Kalamazoo, Mich., presented a paper on air conditioning in paper and printing plants.

Election of Officers

In the afternoon the annual business meeting was held and the following officers were elected:

President, Frank J. Timmerman, Northern Paper Mills, Green Bay, Wis.; 1st vice-president, Brydon D. Millidge, Howard Smith Paper Mills, Cornwall, Ont.; 2nd vice-president, F. L. Zellers, French Paper Company, Niles, Mich.; 3rd vice-president, H. H. Harrison, Crystal Tissue Mills, Middletown, Ohio; 4th vice-president, A. B. C. Drew, Pairpoint Corporation, New Bedford, Mass.; 5th vice-president, Oscar Stamets, Riegel Paper Corporation, Riegelsville, N. J.; Secretary, E. J. Eminger, Miamisburg, Ohio.

C. E. Whitney and Jacob Kindelberger Speak

After the election, two very interesting talks were given —one by Carl E. Whitney, council American Pulp and Paper Association, on the work of the committee on public affairs; the other by Jacob Kindelberger, chairman of the board, Kalamazoo Vegetable Parchment Company on mills visited on a recent tour he took in South America, also on past experiences gained in connection with the paper industry. A joint banquet was held in the evening with the president, Charles Champion presiding and Francis J. Bowman, toastmaster. The presentation of the past-president's jewel and also the presentation of the L. D. Post trophy to Charles Champion. The toastmaster then presented Charles Milton Newcomb, Delaware, Ohio—who presented a talk on "What Are You Afraid Of?", after which a fine entertainment was enjoyed, also dancing.

Entertainment for the Ladies

A very fine program was laid out for the ladies who attended the convention and during the three days they visited the furniture factories, the Cascade Country Club, the gardens of John W. Blodgett, the Blythefield Country Club, enjoyed an informal talk by Bertha Hall, nationally known hand writing expert, and played golf, tennis and bridge.

E. J. EMINGER
Secretary

Paper and Pulp Mill Machinery Exhibit

During the convention there was given one of the finest exhibits of paper and pulp mill machinery and supplies ever held. The Civic Auditorium being an ideal spot for this, having plenty of room, making it possible to have large displays and many of these displays had actual machinery and many of them complete models running. It was not only interesting but very educational and the many new pieces of machinery and equipment, some of which has not been seen before, gave the superintendents an excellent opportunity to learn of the many new things going on in the field.

During the convention a unique honor was conferred upon Michael J. Redmond, who was made an honorary past president of the association. This action met with the warm general approval of all present.

Papers in Technical Section

Most of the papers presented at the convention are printed in this weeks issue of the PAPER TRADE JOURNAL, beginning on page 93.

H. H. HARRISON
Third Vice-President

OSCAR STAMETS
Fifth Vice-President

Machinery and Supply Firms Make Attractive Exhibits at Grand Rapids Convention

American Cyanamid & Chemical Corp.

American Cyanamid and Chemical Corporation, New York., exhibited its line of chemicals and raw materials for the paper industry as well as paper manufactured from its products.

American Rolling Mill Co.

The American Rolling Mill Company, Middletown, Ohio, displayed spiral welded pipe in 6 inch to 36 inch diameter, in addition to various types of couplings. Harold Neill of the company's home office was in charge of the exhibit.

Appleton Machine Co.

Appleton Machine Company, Appleton, Wis., had on display various types of super calender rolls such as paper filled and cotton filled rolls and those used in the manufacture of embossed papers. In addition there were placards showing the complete line of machinery manufactured by the company.

Armstrong Machine Works

Armstrong Machine Works, Three Rivers, Mich., exhibited a glass model of the Armstrong trap showing how the trap will discharge air and dirt as well as condensate. Along with the steam trap were featured the instruments used in its moisture control system. Part of these instruments were tied in with the steam trap demonstration and showed the extreme sensitivity of the apparatus.

Automatic Transportation Co.

Automatic Transportation Company, Chicago, Ill., showed its latest designed telescopic, tilting, tiering fork truck. This truck incorporates all of the latest features of design which were found desirable not only for general manufacturing, but also in the handling of paper, either in rolls or in flat sheets on pallets, or directly on the forks. It is also applicable for handling bales of pulp in the same manner. This truck can be furnished in practically any desired lifting height, or any capacity up to 16,000 pounds. It can also be equipped with scoop to handle roll paper either on end or on its side, and the scoop in turn can be made either of the stationary or revolving type to reverse position of the roll.

Beloit Iron Works

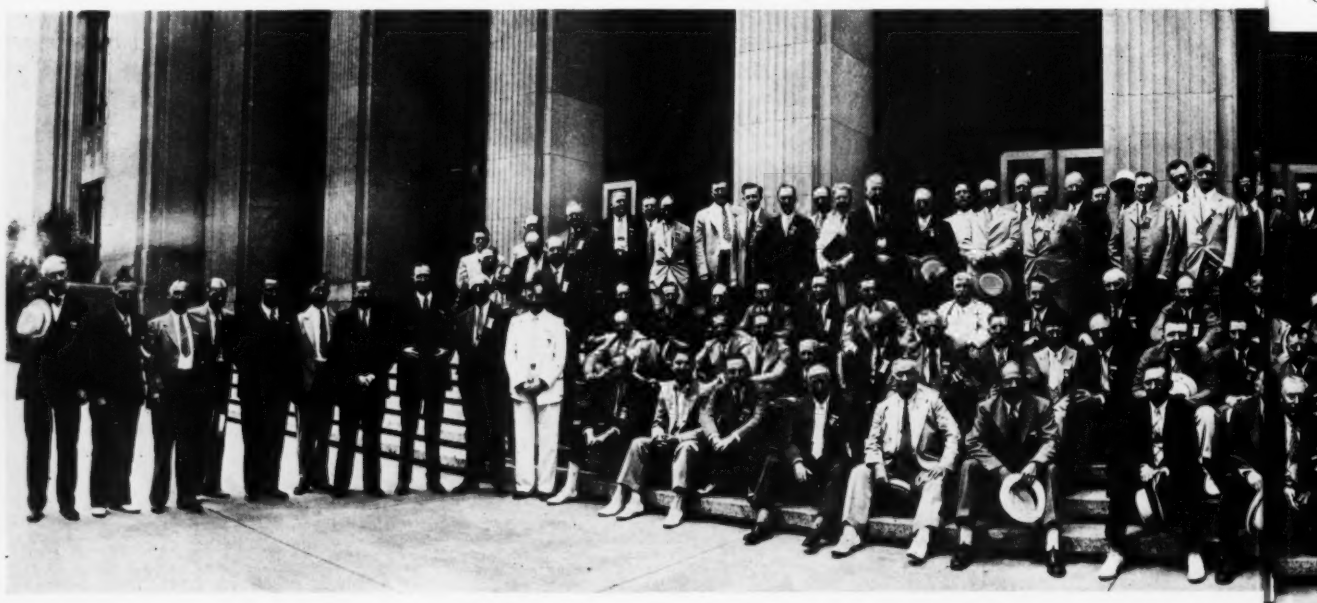
Beloit Iron Works, Beloit, Wis., featured the new Beloit horizontal dual press arrangement which it now has in operation giving excellent results. A small model illustrating this horizontal press showed many interested persons just how this arrangement works out.

Bird Machine Co.

Bird Machine Company, South Walpole, Mass. This exhibit consisted of a display table on which all types of Vickery doctors for press rolls, driers and calenders were shown. These included the standard Vickery Hi-Angle, the Vickery Heavy-Duty Hi-Angle doctors, as well as the Vickery Hi-Flex doctor. Short lengths of 2-inch and 3-inch Bird self-cleaning shower pipes were shown. An interesting part of the exhibit was the display of large size framed photographs of various items manufactured by the company, such as the Bird screen, the Bird save-all, the Bird pulp screen, the Bird centrifiner, the Vickery felt conditioner and the Vickery doctor. Franklin F. Frothingham, Howard G. Mayshaw, W. P. Burleigh and F. K. Becker of the company were in attendance.

Black-Clawson Co. and Shartle Bros. Machine Co.

Black-Clawson Company and Shartle Brothers Machine Company had a large joint display of the two com-



PICTURE TAKEN AT THE SEVENTEENTH ANNUAL CONVENTION OF THE AMERICAN PU

panies. The exhibit showed pumps, valves, steam fittings and photographs of the different machines made by the Black-Clawson Company. Also showed the famous Tug Boat Annie in operation together with a new type of jordan plug and a Shartle sleeve screening and repulping system. Shartle Brothers showed a working model of the Turner Metering System, a new development for metering and proportioning furnish to the paper machine. This is the latest and a very simple method of metering ground wood and sulphite pulps, color, alum and bleach liquor, etc. This was one of the largest and best exhibits on the floor.

A. E. Broughton & Co.

A. E. Broughton & Co., Glens Falls, N. Y. This display showed the Broughton Unit control for flat boxes.

Cameron Machine Co.

Cameron Machine Company, Brooklyn, N. Y. This exhibit covered the wide range of paper and board cut on Cameron slitters and roll winders.

Chicago Belting Co.

Chicago Belting Company, Chicago, Ill. This exhibit was unusual in that it represented the leather belting industry rather than the company and furnished an extraordinarily popular, educational show. It won the silver cup out of 206 exhibits at the Chicago Industry Show.

Chromium Corp. of America

Chromium Corporation of America, Chicago, Ill. This exhibit featured a Crodon plated cast iron drum 24-inch face by 22-inch diameter showing a hard, absolutely flawless ground surface designed for coating, creping, drying and cooling paper or modifications of it. A first and second prize were to be awarded for the closest guesses to the actual number of revolutions the roll made during the course of the convention period, but the names of the winners were not available when this was written. Crodon plated curved and flat plates and samples of suction box covers gave those present an opportunity to observe latest developments in plating workmanship, finish and construction. Other parts on display included a plated embossed and color roll both having been in service for some time. Those in attendance at the booth were J. S. Mohr, O. A. Wettlaufer and H. L. Garvens.

Continental-Diamond Fibre Co.

Continental-Diamond Fibre Company, Newark, Del., showed synthetic resinous products used in the paper mill industry. Included in the exhibit were suction box cover, a doctor blade, table roll, piping and other applications of this nature.

Covel-Hanchett Co.

Covel-Hanchett Company, Big Rapids, Mich., at its interesting exhibit showed its No. 450-A slitter knife grinder. This is the latest model of this machine. It is equipped with a straight grinder wheel instead of the cup type grinder wheel. The company has found it necessary to build these machines in both the straight wheel and cup wheel type in order to cover every possible requirement in handling all types of slitter knives. The company also showed its AK cabinet base mammoth traveling wheel grinder. These grinders, in addition to doing a very accurate grinding job, possess the feature of requiring only about one-half the operating floor space needed for a traveling table type of grinder. The grinding wheel is mounted on a carriage and travels by the work which is positioned on a stationary table or support. The line comprises three series of AK traveling wheel grinders which are known as AK Cabinet Base, AK Pedestal Base and AK Standard. The company also exhibits its No. 928 circular saw sharpener. The latest models of these machines, it is said, embody much the most satisfactory action yet developed for automatically sharpening the cross-cutting teeth of circular saws. The action maintains an absolutely uniform bevel the full length of the tooth, eliminating the slight variation allowed in earlier model machines. The controls give a wide range for adjustment of the machine to a wide variety of saws, making these sharpeners especially serviceable in handling either a limited number or a large variety of saws on various sizes and with different sizes, types and spacings of teeth, either solid or inserted tooth and with different degrees of bevel from 0 to 45 degrees.

D PAPER MILL SUPERINTENDENTS ASSOCIATION, GRAND RAPIDS, MICH., JUNE 24-26, 1936.

Dodge Manufacturing Co.

Dodge Manufacturing Company, Mishawaka, Ind., had a very fine exhibit. The background of this display comprised a photographic enlargement of their machine shop 20 feet wide by 8 feet high. It also showed the moving power transmission used in paper and pulp mills such as sectional drives, friction clutches, anti-friction bearing, variable speed transmission, V-belt drives. This exhibit gave a very complete illustration of all the Dodge equipment for paper mills and was of educational value to the superintendents.

Downingtown Manufacturing Co.

Downingtown Manufacturing Company, Downingtown, Pa., showed a working model of the Downingtown patented top press roll drive. This consists of two press rolls, 12-inch diameter by 24-inch face, mounted in bearings and housings. The bottom roll was driven from a motor through a gear reducer. The top roll was driven through a variable speed unit. The input end of this unit was driven from the bottom roll shaft with roller chain and sprocket. The output end carried a spur pinion which meshed with the gear on the top roll journal. The whole unit was mounted on a table where it could be seen and operated by the mill men. The company also showed a series of motion pictures of modernized board machines. There was a special feature in the movies entitled "Applying Rubber Covers to Suction Rolls." The company was represented by Charles L. Ellis, Oscar C. Cordes and G. Clifton Walton.

Draper Manufacturing Co.

The Draper Manufacturing Company, Port Huron, Mich. This exhibit consisted of brass and semi-steel balls, ball check valves, flat seat facing tools and globe valve tools for repairing flat seat and globe valves, pump valve facers and superheater ball joint tools for repairing superheater valve ball joints, also ball unions. The company was represented by Thos. Draper, president, and Thomas A. Draper.

E. I. du Pont de Nemours & Co., Inc.

E. I. du Pont de Nemours & Co., Inc., Chicago, Ill. This exhibit was a booth sponsored jointly by E. L. du Pont de Nemours & Co., Inc.,—Dyestuffs Division, Grasselli Chemical Division, R. & H. Chemical Division and Paint and Varnish Division.

Durametallic Corp.

Durametallic Corporation, Kalamazoo, Mich. This display consisted of a high back board with wings at each end, covered with black velour and trimmed in silver, and across the top of the large panel were the words "Durametallic Packings" in silver letters. In the center near the top of the center panel was a replica of a large stuffing box which had a polished rod moving back and forth through a Durametallic packing assembly. Mounted on this center panel on each side of the moving display were cut-a-way packing assemblies of Durametallic packings. On the right wing were samples of Dura Plastic and the left wing contained mounted sections of Dura Seal mechanical packing. On a counter which extended out from the back panel, nine feet long at a height of 3½ feet, were samples of Durametallic packings and Dura hooks. Also mounted under the moving display were a set of six Dura hooks for removing packing. Mounted on a base on one of the tables near the exhibit was a sample model of Dura Seal mechanical packing.

Duriron Co.

Duriron Company, Inc., Dayton, Ohio, exhibited corrosion-resisting equipment for pulp and paper mills. For the paper mill there was shown Duriron and Durichlor valves, pumps, pipe and fittings, alum dissolving jets, hydraulic ejectors and similar equipment for alum and bleach. For the pulp mill, an alloy steel pump, Y, gate and globe valves in alloy steel, Panzl strainers and cross sections of various valves and castings were displayed. A feature of this booth was the new type of sign used. Lights in back of the sign gave the letters a neon-tube appearance, although the material used was perfectly flat and stood on edge as viewed by the spectator. The letters were made of crimped cellulose.

Edgar Bros. Co.

Edgar Brothers Company, New York, showed a complete line of clays for paper manufacture.

Garlock Packing Co.

Garlock Packing Company, Palmyra, N. Y. This exhibit presented a line of mechanical packings and oil seals particularly suited for paper mill usage. R. W. Perkins, district sales manager and L. W. Marsh, sales representative, at Cleveland, Ohio, were in attendance at the convention.

Gatke Corp.

Gatke Corporation, Chicago, Ill. This exhibit made a general showing of Gatke products. Literature describing in detail these various products was available. C. R. Mahaney and W. Peterson of the home office represented the company.

General Electric Co.

The General Electric Company and the General Electric Supply Corporation had adjoining booths. The General Electric Company exhibited its new line of motors, showing the standard sleeve and ball bearing motor, the splash proof motor, and the totally enclosed fan cooled motor. In addition, a running cut-away gear motor was shown. The company also displayed a speed regulator such as is used in maintaining speed on paper machines. The General Electric Company also showed kits which displayed the complete construction of motors, etc. Two novel attractions were shown: one a mysterious magnetically controlled sphere, steel balls and spinning coin, and the other a shadow box giving an optical illusion of a dancing lady.

Gilbert & Nash Co.

The Gilbert & Nash Company, Menasha, Wis., exhibited its recently developed wire and felt guides, mechanical and electric web guides and the Gilbert & Nash patented dandy stands equipped with the Cheney Bibelow trunnion open end dandy roll. The company also showed the Nash flexible tube roll drive equipped with the Gilbert & Nash combination guide and guide roll and stretch. By using this combination and elevating the couch roll moving the suction boxes forward, three and a half feet to four feet can be gained for paper formation on the wire. This model is clothed with a special welded seamed wire manufactured by the International Wire Works, Menasha, Wis. A quick wire changing device was also demonstrated and a cash prize was to be awarded for guessing the time required for changing the wire, although the name of the winner is not available at this writing.

L. H. Gilmer Co.

L. H. Gilmer Company, Tacony, Philadelphia, Pa., exhibited Gilmer multiple drive V-belts and Kable Kord flat belting as used in paper mills. The exhibit was in charge of E. A. Goetter of the Gilmer branch office at Chicago. A. B. MacFarland of the main office in Philadelphia was also in attendance.

Great Lakes Supply Corp.

This exhibit was sponsored by the Great Lakes Supply Corporation of Chicago, distributors of the products of the Republic Rubber Company of Youngstown, Ohio and Quigley Company, Inc., of New York. W. G. Larmoth, mechanical engineer of the Great Lakes Supply Corporation, and John R. Tallman, territorial representative of the company, were in attendance.

The products of the Republic Rubber Company which were displayed were transmission and conveyor belts, steam, water, air and paper mill wash up hose. M. W. "Bill" Clark of the Republic Rubber Company was in charge.

The Quigley products which were exhibited included Hytempite high temperature cement for bonding fire brick and tile, the new type of Insulbrix which is an insulating refractory brick, a complete line of fire brick, plastics, castables, etc. Quigley A.A.A. protective coatings which are used extensively in the paper mill industry for the protection of steel, wood, etc.; and Annite which is a colloidal detergent and used in the industry for felt washing, were also shown. L. V. Hill of the Quigley Company was in charge of the Quigley exhibit.

Greene, Tweed & Co.

Greene, Tweed & Co., New York, N. Y., had a very attractive exhibit showing the full line of packings manufactured by the company, including Palmetto packing, Palco plated packing, Pelro packing, Cutno packing, Super Cutno packing and Klero packing. The company also exhibits its Favorite reversible ratchet wrench, Basa soft-faced hammer and Moran's steel belt couplings.

Heller & Merz

Heller & Merz, New York. The colors of the spectrum were glorified in this exhibit.

Hermann Manufacturing Co.

Hermann Manufacturing Company, Lancaster, Ohio, made a very interesting exhibit at which they displayed James d'A. Clark's Original Kollergang beater for precision pulp testing, Hercules assembled Jordan shell filling, Unkle improved rag catcher, the Hercules re-fillable steel plug liner and Hermann pulp testing apparatus.

Horton Manufacturing Co.

The Horton Manufacturing Company, Minneapolis, Minn., exhibited the Horton Variable Speed Pulley. This pulley is a spring tensioned, governor controlled device which loosens initial inertia of the driven machine without jerk or shock and holds the torque substantially uniform while accelerating to full speed as slowly or as quickly as desired by the operator. E. M. Ferguson, secretary-treasurer of the company, and A. M. Barton were in attendance at the booth.

International Nickel Co., Inc.

International Nickel Company, Inc., New York, N. Y. This exhibit furnished a key to the many uses of nickel and nickel alloys in the paper industry. Included in the display were pieces of actual equipment made of nickel, Monel Metal, Ni-Resist, Nickel-Clad steel and similar materials. A novel feature was the showing for the first time of a new material produced by the Youngstown Welding and Engineering Company. This was a bi-metal product and consisted of an outside roll of nickel or Monel Metal welded to an inside roll of steel, aluminum or other materials. One of the outstanding advantages claimed for this material is that it provides the protection of pure Nickel or Monel Metal where economic reasons do not justify a solid metal. These new rolls are being produced on a commercial basis after a three-year period of research and experiment. The clad rolls are especially suited for paper rolls on paper machines. E. A. Turner and T. E. Lagerstrom represented the company.

Jenkins Bros.

Jenkins Brothers, New York, N. Y., exhibited Jenkins bronze globe, angle and check valves; Jenkins iron body globe, angle, check, gate and automatic equalizing stop and check valves and Jenkins cast steel gate valves. Among these were types and patterns for nearly every valve requirement found in the power plant of pulp and paper mills. These valves, numbering more than 100, were attractively displayed around a modernistic and electrically illuminated background which featured the Jenkins "Diamond" trademark and called attention to the fact that Jenkins valves are designed for "life-time service." T. C. Irwin and R. B. Osgood, Chicago representatives, and Charles Chamberlain, advertising manager, represented the company.

Johns-Manville Corp.

The Johns-Manville Corporation, New York, N. Y., exhibit featured J-M packing service and showed the progressive steps in the manufacture of asbestos packings. Also on display were J-M rotproof roofing, J-M insulations, J-M refractories cements, J-M transite pipe and J-M friction materials. J. W. Hemphill and M. K. Cumming, staff engineers from New York, and T. A. Finch, Grand Rapids representative, were in attendance.

E. D. Jones & Sons Co.

E. D. Jones & Sons Company, Pittsfield, Mass. This exhibit consisted of a booth, the backside of which was lined with enlargements of photographs showing the details of the various equipment manufactured by the company, including Jones Multibeater, Jones Vortex engine, Jones screen, two types of Jones jordans and refiner. There was available at the booth descriptive literature and drawings of assemblies and details of the equipment for purposes of direct discussion of stock preparation problems with any paper mill operators who cared to go into some of their particular problems. Geo. H. Spencer, general manager, was in charge of the booth.

Samuel M. Langston Co.

Samuel M. Langston Company, Camden, N. J. This exhibit was very colorful in appearance, the designs being in black and gold with large reproductions of the Langston slitters and rewinders installed in the various pulp and paper mills.

Lansing Stamping Co.

Lansing Stamping Company, Lansing, Mich., exhibited its line of all sizes of paper plug cores, also a collection of different sizes of cores and showed the way Perfection metal core plugs fit into these cores. A miscellaneous group of heavy industrial pressed metal parts and automobile stampings were also exhibited. M. W. Jacklin and W. T. Devereaux represented the company.

Lewis-Shepard Co.

Lewis-Shepard Company, Watertown Station, Boston. A 3500-lb. capacity Master Jacklift was shown at this exhibit, as well as a drum drain stand, a carboy pourer and a carboy truck with pneumatic tires. A Lewis-Shepard universal hydraulic lift truck and a Lewis-Shepard telescopic stacker were also on display.

Link Belt Co.

The Link-Belt Company, Chicago. This exhibit included a "Scene-in-Action" unit of the Link-Belt drier; operating units of a motorized P.I.V. gear and Link-Belt motorized reducer; samples of Link-Belt anti-friction pillow blocks, babbitted bearings, take-ups, grease cups, safety collars, "RC" couplings, belt conveyor idler, Promal castings, elevating and conveying chains and silent and roller chains. Two panels of installation photographs of Link-Belt conveyors and positive drives in pulp and paper plants were on display. P. L. Conway, H. F. Weber, Harry Johnson and M. Parykaza of Chicago; George Dettling, Grand Rapids; H. L. Hoefman and Ray Wood of Detroit were the Link-Belt representatives in attendance.

D. J. Murray Manufacturing Co.

D. J. Murray Manufacturing Company, Wausau, Wis., displayed one of the company's unit heaters complete in operation and also showed a sectional portion of the heater showing the construction. In addition to this there were two large sign boards on which were tacked circulars describing some of the machinery and equipment which the company builds. The Charles H. Alexander Company, the representative of D. J. Murray Manufacturing Company at Grand Rapids, constantly had someone in attendance at the booth to welcome visitors. In addition, the president of the D. J. Murray Manufacturing Company, F. C. Boyce, was at the convention as was also C. L. Durkee, sales manager of the Paper Mill Division of the company.

Nash Engineering Co.

Nash Engineering Company, South Norwalk, Conn., and the Graybar Building, New York City, as a feature of their exhibit showed a Cone Type Hytor Vacuum Pump, disassembled to show the structural features. Paper mill superintendents and other operating executives thus had an opportunity to see just how this type of pump is constructed which proved very interesting to many who have been running Nash pumps for years without ever having occasion to open one of them. In attendance at the Nash exhibit were Carl Vicario, head of the Pulp and Paper Division of Nash Engineering Company, and his associate, C. L. Clark.

O'Connor Screen Co.

The O'Connor Screen Company, 3532 North 11th street, Philadelphia, Pa., showed its new Noiseless Laboratory Screen for pulp and paper mills and allied industries. After several years of experimental work by a trained paper mill mechanic, this screen is offered to meet the requirements ssential to laboratory practic. Thorough tests have been made and results show that with a .012 cut plate ledger stock of 1 per cent consistency and 100 per cent rag stock of .78 per cent consistency can be easily screened. The screen is of bronze and copper construction throughout. To operate the agitator at a speed of 350 to 400 r.p.m. a ¼ h.p. motor is required. A 10 inch main pulley for V-Belt will be furnished with the screen.

Paper and Industrial Appliances, Inc.

Paper and Industrial Appliances, Inc., New York, N. Y. This exhibit included either the equipment itself or models, circulars or pictures of the following equipment: Thorsen-Hery beater; hydraulic beating systems, complete double selective systems for waste papers; high pressure Fibro-pump; P. & I. target; high consistency agitation and circulation; Sturtevant bale pulper; Sturtevant aquator; Poirier weight governor; precision consistency Regulator; P. & I. foam killer; T.B.M. gravity classifier; P & I settling tank; P & I improved spray damper; P & I shower pipe and P & I Colthurst chest.

Paper Makers Chemical Corp.

Paper Makers Chemical Corporation made a very large exhibit of their many and varied products used in the making of paper, also showed naval stores, cellulose products, general industrial chemicals and textile chemicals.

Productive Equipment Corp.

Productive Equipment Corporation, Chicago, Ill., exhibited a 2-foot by 6-foot double deck open type Selectro vibrating screen for use in screening wood chip and paper fillers. The company was represented by L. E. Soldan, chief engineer and L. H. Lehman, sales manager.

F. Raniville Co.

F. Raniville Company had a large display showing their Grandy fabric belt, Ton-tex composition belts and Ran-I-Ville leather belting, which gives a complete line of belts for all purposes, such as conveying, transmission, powers etc. They also had a display of belt wax and cement.

H. H. Robertson Co.

H. H. Robertson Company, Pittsburgh, Pa. As a central part of this exhibit there was shown a built-up display, the central panel of which was a frame for lighted "Translite" prints on a revolving drum showing installations of Robertson products in the paper industry. The two side panels contained information of interest to paper mill superintendents regarding the daylighting and ventilating of paper mills. Samples of various Robertson products as well as descriptive literature was available. H. B. Winslow, sales promotion manager; J. D. Kehr of the Chicago office and W. E. Nichols, Detroit district manager, represented the company.

Rockwood Manufacturing Co.

Rockwood Manufacturing Company, Indianapolis, Ind. The principal item of this exhibit consisted of the Rockwood Pivoted motor base display unit. This unit carried a typical arrangement for floor mounting, another for ceiling mounting and two for vertical mountings, one with the motor above the driven shaft and the other with the motor below the driven shaft. All of the drives were operating driven shafts to which loads can be applied as desired so as to show the action of the drive, not only under the rated load of the motor, but under severe overloads. There were also on display typical Rockwood sheaves and V-belts and Rockwood paper pulleys. Visitors to the booth were greatly impressed by the unusual performance demonstrated with Rockwood drives.

Sinclair Co.

The Sinclair Company, 60 Appleton street, Holyoke, Mass., exhibited a new type cylinder mould of very interesting construction. The Super-structure consists of a very deep groove winding wire spaced on rods that are designed for both strength and stream lined to follow through inner body of water without friction, the winding wire being locked to the structure of the frame so that it will not come loose in the running of the mould. The design also appears to lend itself to better formation of paper. Another feature of the Sinclair exhibit was the latest type of double truss open end trunnion dandy roll with a novel arrangement of shower pipes, wiper and lifting mechanism. This is the Sinclair single pedestal open end trunnion stand. The covering on the dandy roll is Sinclair smoothface flat monel wire cloth designed to reduce wire marks to a mini-

TWICE

AS CLEAN AS EVER BEFORE!

New, big capacity Bird Screens with fine cut plates are cutting dirt count 50% or more for a great many paper makers. . . . If they can do it for your paper, too, it's a mighty inexpensive way to boost volume and profit. . . . Why not see what they can do?

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mum. A novel dandy roll stand and light weight dandy roll for localizing water marks also was shown. Fourdrinier, cylinder and dandy roll wire cloth as well as various types of seams also appeared in the Sinclair exhibit. Samples of water marked hand made paper featuring likenesses of prominent men of the past and a watermark of Britain's new pride of the seas "Queen Mary" attracted much attention.

S K F Industries, Inc.

S K F Industries, Inc., Philadelphia, Pa., made one of the outstanding exhibits. In addition to their elaborate display of many types and sizes of anti-friction bearings, they showed a new type of drier cylinder mounting that has proven particularly successful in compensating for drier cylinder expansion. These mountings have already been installed on several large paper machines and others are in courst of construction. C. N. Benson, F. H. Stearns and B. R. Sackett represented the company at the exhibit.

Socony-Vacuum Oil Co.

Socony-Vacuum Oil Company. This exhibit had a large world map showing Socony-Vacuum world operations. Also pictorial material showing the general use of their lubricants in the paper and pulp field.

Standard Oil Co. of Indiana

Standard Oil Company, Chicago, had a very fine display showing a complete line of lubricants especially adapted to use in the paper and pulp field, together with wax for waxing paper.

Stearn's Staford, Inc.

Stearn's Staford, Inc., Lawton, Mich., made a fine exhibit showing their heavy duty staggert roller radio and thrust bearing. These anti-friction bearings are for jordans, calender stacks and cylinder molds. These bearings are self aligning. A special showing was made of a top and bottom bearing for calender stacks. The roll has three staggert solid rolls held in proper alignment to each other.

Stickle Steam Specialties Co.

The Stickle Steam Specialties Company, Indianapolis, Ind., displayed a sample of the new Stickle micro adjustable orifice for paper machine driers and cut open samples for the new AE and Pop Valve steam traps. At the exhibit also there was a large photograph of the Stickle feed water heater, Vacuum blast coil heater and Oil and Steam Separator. F. A. Stickles, president of the company, Peter J. Abel and Walter Tiedeman welcomed visitors to the booth.

Sound Engineering Corp.

The Sound Engineering Corporation, Chicago, showed a 15,000 volt Dielectric Strength Tester, High Resistance Meter, Constant Temperature Cabinet, Paper Caliper and a Basis Weight Measuring Device, all of which were in operation. The company also had on display an endless sheet of paper revolving on drums being calipered and weighted. E. H. Yonkers and J. L. Yonkers were in attendance at the booth.

Trimbey Machine Works

The Trimbey Machine Works, Glens Falls, N. Y., exhibited a Trimbey "Pump Type" consistency regulator; Trimbey "Mixing Box Type" consistency regulator; individual motor driven color or alum meter; Allen-Witham, Jr., thin stock consistency regulator and a Trimbey float valve for heavy pulp. The first two of the above items will be shipped direct from the exhibit as repeat orders from mills. It was stated also that a pump type regulator and a second regulator were being shipped as repeat orders direct from Glens Falls to the Pacific Mills, Ltd., of Ocean Falls, B. C., and a mixing box type regulator as a repeat order will be installed at the Standard Division of the Sutherland Paper Company, at Kalamazoo, Mich., for use on board mill stock. R. J. Trimbey and A. G. Hatcher represented the company at the exhibit.

Yale & Towne Mfg. Co.

Yale & Towne Manufacturing Company had a display of their Multistroke Lift Truck for use in all hand conveying. Also their electric High Lift trucks for handling and tiering rolls, boxes, etc., together with the Yale chain hoists, either for monorail systems or individual hoists to be hung where needed. This exhibit was in charge of H. W. Gaineshaw, F. G. Nyman and F. A. Dewey.

Rapid Progress on Champion Paper Mill

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, June 27, 1936—Information received here this week indicated that rapid progress is being made in the construction of buildings at the plant of the Champion Paper and Fiber Company near Houston, Texas, and that the mill will be placed in operation during the coming Fall. It is expected that mill equipment will begin arriving within the next five or six weeks, at the latest.

More than 200 workmen are now employed on the project. Foundations were placed the past week for the main mill building. Riggers were busy fabricating the steel framework for the huge machine shop.

Progress on the tank farm, at the south end of the site, which is to be used for storing stock, is being made, officials said, with many of the concrete tanks finished.

A crew with a pile driver has set most of the footings for the dock on the bank of the Houston Ship Channel, and this part of the mill will be ready long before the plant goes into operation.

In an effort to speed construction of all units, the Morton C. Tuttle Company, Boston, Mass., the contractors, are running crews at top strength. The work on buildings for housing special apparatus was moving on time, with crews keeping pace with progress of contractors.

A system of shell roads has been completed on the 160-acre site, and material is moving in by truck as well as by rail over the recently completed spur from the Houston Belt and Terminal, according to W. R. Crute, plant superintendent.

Power for operating the plant will be drawn from the Deepwater power house of the Houston Lighting and Power Company.

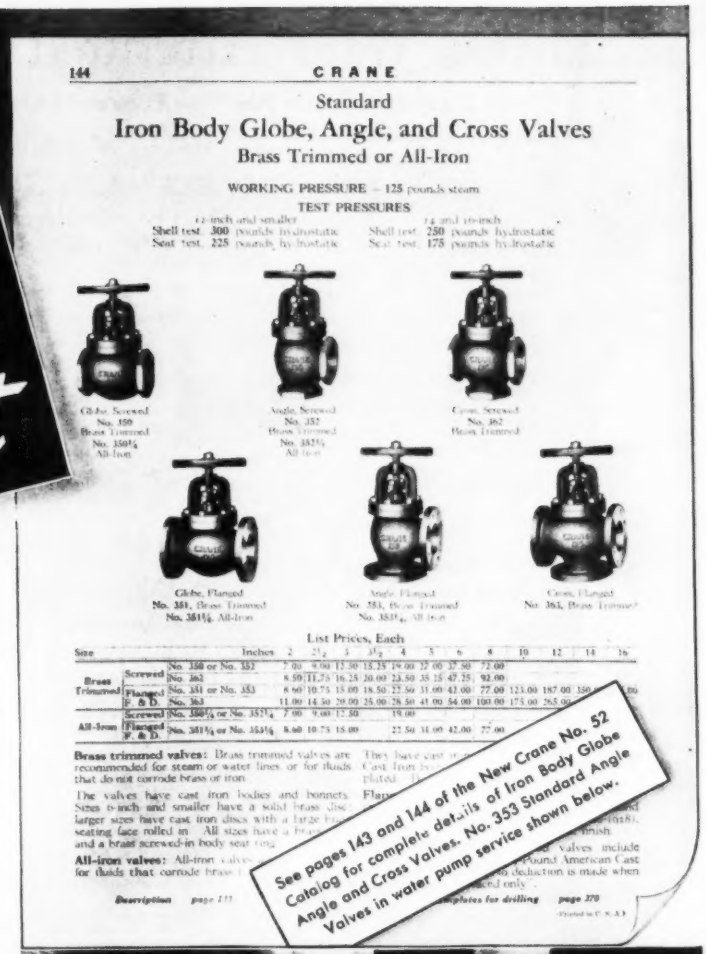
The Hamilton company will provide its own water supply needed in processing the fiber. This will require a vast amount, with no less than eight artesian wells being drilled at wide intervals, to insure an adequate supply.

P. S. Hanway Heads Employment Study

WASHINGTON, D. C., July 1, 1936—Paul S. Hanway, of the National Fibre Can and Tube Association has been chosen chairman of a special committee to study employment of the Council for Industrial Progress.

The first objective of the new committee, it has been announced, is a census of unemployment and an inventory of employment throughout industry in order to establish definitely the extent of unemployment and the status of employment. A tentative program of research preparatory to drafting a report to be submitted to industry and the government has been completed by the committee.

ECONOMICAL IN First Cost LOW IN Total Cost


144 CRANE

Standard

Iron Body Globe, Angle, and Cross Valves

Brass Trimmed or All-Iron

WORKING PRESSURE — 125 pounds steam

TEST PRESSURES

12-inch and smaller
Shell test 300 pounds hydrostatic
Seat test 225 pounds hydrostatic

14 and 16-inch
Shell test 250 pounds hydrostatic
Seat test 175 pounds hydrostatic

Globe, Screwed No. 350 Brass Trimmed No. 350¼ All-Iron

Angle, Screwed No. 352 Brass Trimmed No. 352¼ All-Iron

Cross, Screwed No. 362 Brass Trimmed

Globe, Flanged No. 351, Brass Trimmed No. 351¼, All-Iron

Angle, Flanged No. 353, Brass Trimmed No. 353¼, All-Iron

Cross, Flanged No. 363, Brass Trimmed

List Prices, Each

Size		Inches	2	2½	3	3½	4	5	6	8	10	12	14	16
Brass Trimmed	Screwed	No. 350 or No. 352	7.00	9.00	12.50	15.25	19.00	27.00	37.50	72.00				
		No. 362	8.50	11.75	16.25	20.00	23.50	35.25	47.25	92.00				
	Flanged F. & D.	No. 351 or No. 353	8.60	10.75	15.00	18.50	22.50	31.00	42.00	77.00	123.00	187.00	350.[illegible]	[illegible]
		No. 363	11.00	14.50	20.00	25.00	28.50	41.00	54.00	100.00	175.00	265.00	[illegible]	[illegible]
All-Iron	Screwed	No. 350¼ or No. 352¼	7.00	9.00	12.50		19.00							
	Flanged F. & D.	No. 351¼ or No. 353¼	8.60	10.75	15.00		22.50	31.00	42.00	77.00				

Brass trimmed valves: Brass trimmed valves are recommended for steam or water lines, or for fluids that do not corrode brass or iron.

The valves have cast iron bodies and bonnets. Sizes 6-inch and smaller have a solid brass disc; larger sizes have cast iron discs with a large brass seating face rolled in. All sizes have a brass [illegible] and a brass screwed-in body seat ring.

All-iron valves: All-iron valves [illegible] for fluids that corrode brass [illegible]

They have cast [illegible] Cast Iron [illegible] plated. [illegible]

Flan[illegible] [illegible] valves include [illegible] Pound American Cast [illegible] deduction is made when [illegible] only".

Description page 1[illegible] [illegible]plates for drilling page 370

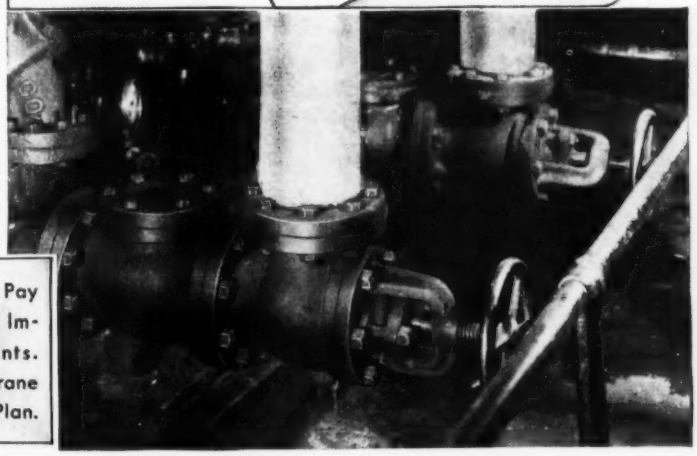
See pages 143 and 144 of the New Crane No. 52 Catalog for complete details of Iron Body Globe Angle and Cross Valves. No. 353 Standard Angle Valves in water pump service shown below.

● Both steam and water represent a large portion of your production cost. Any waste is naturally reflected at the coal pile.

Considered individually, each leaky joint or valve may seem to be of small consequence. Considered collectively, for even a short period of time, the combined cumulative loss may be appreciable. Add to this, the cost of trying to make and keep leaking valves and fittings tight and you are likely to find losses exceeding the cost of new valves or fittings—which will remain tight, require but minimum maintenance.

Where general-service valves are leaky, we suggest replacement with Crane Standard Iron Globe and Angle Valves. They are economical in first cost and—even more important—maintain their initial tightness and ease of operation for a long time. They require only minimum maintenance. They are made in both screwed and flanged types and in all-iron, too, for use where corrosive conditions exist.

Ask your local Crane branch or distributor to show you one of these standard iron valves and note how sturdily constructed it is and how convenient it is to service.



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VALVES, FITTINGS, FABRICATED PIPE, PUMPS, HEATING AND PLUMBING MATERIAL

Those Who Attended the Convention

Official Registration of the American Pulp and Paper Mill Superintendents Association

A

Anderson, Sam, Hooker Electrochemical Co.,
Aronold, O. P., Stowe-Woodward Co., Buffalo, N. Y.
Allison, A. J., Simonds Worden White Co., Dayton, Ohio.
Ahles, E., Mosinee Paper Mills Co., Mosinee, Me.
Aiken, Walter, The Clark-Aiken Co., Lee, Mass.
Anderson, S. C., Joseph T. Ryerson & Son, Inc., Chicago, Ill.
Abercrombie, R. P., Cheney Bigelow Wire Works, Springfield, Mass.
Angle, L. E., Standard Oil Co., Grand Rapids, Mich.
Ashley, W. M., Standard Oil Co., Grand Rapids, Mich.
Aument, R. P., American Box Board.
Anderson, Melvin D., Westinghouse Electric and Manufacturing Company, Grand Rapids, Mich.
Armstrong, A. E., Armstrong Machine Works, Three Rivers, Mich.
Artz, W. H., Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa.
Andrews, James J., Fox Paper Co., 51 Hereford St. Hartwell, Cincinnati.

B

Bing, H. O., Beloit Iron Works, Beloit, Wis.
Brown, Spencer, Appleton Woolen Mills, Appleton, Wis.
Brooks, M. V., Miamisburg Paper Co., Miamisburg, Ohio.
Barney, E. J., Cornell Wood Products Co., Cornell, Wis.
Bogle, Howard, Central Fibre Products Co.
Brenner, H. O., General Dyestuff Corp.
Barton, A. W., Horton Mfg. Co.
Bush, Edw. A., Hooker Electro Chemical Co., 340 Hancock Ave.
Batchelder, C. L., Paper Makers Chemical Corp., Kalamazoo, Mich.
Bridge, A. E., Shartle Brothers Machine Co.
Bert, Henry, Shuler & Benninghofen.
Baumunne, Harry P., Simonds Saw and Steel Co., Chicago, Ill.
Beiber, Glenn D., Goubold Machine Co.
Buell, J. Lawrence, Grosse Point, Mich.
Beasley, B., Brown Paper Mill Co., Monroe, La.
Batchelor, Tom, Am. Dolthalran Corp., New York City.
Baker, G. A., Duriron Co., Dayton, Ohio.
Burrows, A. A., Burrows Paper Co., Little Falls, N. Y.
Burrows, F. H., Burrows Paper Co., Little Falls, N. Y.
Baxter, Joseph, Shartle Bros. Machine Co., Franklin, Ohio.
Busdicker, E. F., United States Rubber Co., Detroit, Mich.
Braginton, C. A., Michigan Paper Co., Plainwell, Mich.
Brown, F. L., Michigan Paper Co., Plainwell, Mich.
Booth, W. Gordon, Gair Thames Containers, Inc., New London, Conn.
Benson, C. N., SKF Industries, Inc., Philadelphia, Pa.
Benson, Bernard, Williams-Gray Co.
Bush, E. W., Provincial Papers, Ltd., Thorold, Ontario.
Barstow, F. L., U. S. Rubber Co., New York City, N. Y.
Billeiu, Stearns-Staford, Inc., Lawton, Mich.
Brainard, A. T., Ciba Co., Inc., Chicago, Ill.
Beisel, D. N., Wadhams Oil Co. (Socony Vacuum Oil Co.)
Bidwell, Geo. L., Riegel Paper Corp., Riegelsville, Pa.
Baldwin, Henry P., Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis.
Brydges, Wm. H., Bedford Pulp and Paper Co., Big Island, Va.
Boyce, F. C., D. J. Murray Manufacturing Co.
Barton, Raymond, Michigan Paper Co., Plainwell, Mich.
Briggs, B. M., Lawrence Paper Manufacturing Co., Kalamazoo, Mich.
Beighey, Luther C. R., Hammermill Paper Co., Lawrence Park, Erie, Pa.
Burns, W. F., Sonoco Products Co.
Bauer, Chas. L., The Bauer Bros. Co., Springfield, Ohio.
Bliel, C. C., E. I. du Pont de Nemours & Co., Wauwatosa, Wis.
Baumgartner, W. H., E. I. du Pont de Nemours & Co., Cleveland, Ohio.
Broyfogle, L. H., Draper Bros. Co., Kalamazoo, Mich.
Broughton, A. E., A. E. Broughton & Co.
Burleigh, W. B., Bird Machine Co., Chicago, Ill.
Birkeness, O. T., Wallace & Tiernan Co., Chicago, Ill.
Bennett, H. F., Gardner-Richardson, Middletown, Ohio.
Baker, R. S., American Brass Co., Waterbury, Conn.
Bronk, A. W., Moore & Thompson Paper Co.
Bidwell, L. H., Riegel Paper Corp.
Brunner, Walter, B. F. Nelson Manufacturing Co., Minneapolis, Minn.
Burrows, Harold H., Manhattan Rubber Co.
Beecher, Carl K., Draper Bros. Co., Delaware, Ohio.
Boyd, W. H., Vail Rubber Works, St. Joseph, Mich.
Brouwer, John L., 4th, Gibbs-Brower Co., Inc.
Bennett, Joseph D., Dilts Machine Works, Fulton, N. Y.
Butterworth, De Haven, H. W. Butterworth & Sons Co.
Booth, L. M., Booth Chemical Co., Elizabeth, N. J.
Bechard, E. N., Gene Bechard, Nutley, N. J.
J. C. Broman, Standard Oil Co., Kalamazoo, Mich.
Bowen, A. E., Standard Oil Co., Battle Creek, Mich.
Bryson, F. E., Standard Oil Co., Grand Rapids, Mich.
Burns, W. H., Valley Iron Works Co., Appleton, Wis.
Bowman, Francis D., Carborundum Co.
Bither, F. H., American Box Board Co.
Barnhart, W. M., American Box Board Co.
Brooks, Arthur M., Raffold Process Corp.
Baker, M. C., Hudson Sharp Machine Co., Green Bay, Wis.
Berner, G. T., Anaconda American Brass, Ltd., New Toronto, Ontario, Canada.
Burkhalter, E. Y., American Cyanamid & Chemical Corp., New York City.
Boronow, Paul, Valley Iron Works Co., Appleton, Wis.
Burke, Norman, International Paper Co., New York City.
Buchanan, W. E., Appleton Wire Works, Appleton, Wis.
Baker, C. M., American Paper & Pulp Association, Madison, Wis.

C

Carrigan, J., French Paper Co.
Clark, Edwin W., E. C. Aikens & Co., New York City.
Costello, John E., Joe Loughead Co., Kalamazoo, Mich.
Corfield, Mr., Michigan Steel Casting Co., Detroit, Mich.
Cottrell, S. V., National Aniline and Chemical Co., Detroit.
Chermerys, Theodore M., Champion Paper & Fibre Co., Hamilton, Ohio.
Clark, C. L., Nash Engineering Co., Indianapolis, Ind.
Corey, R. W., American Brass Co., Kenosha, Wis.
Coffin, A. A., Titanium Pigment Co., New York.
Child, W. K., Clinton Co., Glencoe, Ill.
Champion, Charles, Millers Falls Paper Co., Millers Falls, Mass.
Crawford, W. A., Dominion Box Board Co., Toronto, Canada.
Cellon, Albert, Foxboro Co., Foxboro, Mass.
Crowley, George, Marathon Paper Mill Co., Ashland, Wis.
Cole, A. W., Rex Paper Co., Kalamazoo, Mich.
Croft, W. H., Esleeck Manufacturing Co., Towner Falls, Mass.
Clarke, J. B., National Aniline & Chemical Co., Chicago, Ill.
Cosler, A. S., The Bauer Bros. Co., Springfield, Ohio.
Callighan, Olin W., Edgar Brothers Co.
Crossman, A. Fred, Lindsey Wire Weaving Co., Cleveland, Ohio.
Cook, R. M., Hinde & Dauch Paper Co.
Costello, Wm., Tonawanda Box Board Co.
Costello, J. W., Tonawanda Box Board Co.
Cornell, John, *The Paper Mill.*
Cumming, M. K., Johns-Manville Co., New York.
Craigie, Geo. W., American Pulp and Paper Mills Superintendents Association.
Champion, C. H., R. T. Vanderbilt Co., New York.
Currier, Bryant, W. S. Tyler Co.
Chittenden, L., Michigan Alkali Co., Chicago, Ill.
Cathey, Glenn V., B. F. Goodrich Co., Akron, Ohio.
Clarke, A. C., John W. Bolton & Son.
Coughlin, Edward T. A., Pettengill, Inc., Kalamazoo, Mich.
Cole, Eugene, The Bagley & Sewall Co., Kalamazoo, Mich.
Calton, F. A., Standard Oil Co., Minneapolis, Minn.
Cobb, C. V., Standard Oil Co., Muskegon, Mich.
Climes, L. F., Standard Oil Co., Grand Rapids, Mich.
Crandall, W., American Box Board Co.
Clark, M. S., Mathieson Alkali Works, Chicago.
Chilson, Warren A., Cellufoam Corp., Chicago, Ill.
Conway, P. L., Link-Belt Co.
Carson, R. G., Solvay Sales Corp., Milwaukee, Wis.
Cordes, Oscar, Downingtown Manufacturing Co., Downingtown, Pa.
Crawford, C. R., Shartle Bros. Machine Co., Middletown, Ohio.

D

Ditmyer, John, Gardner-Richardson Co., Middletown, Ohio.
Dupuis, C. J., Provincial Paper Co., Ltd.
Dunbar, Thomas L., Chemical Pulp Limited Co., Montreal, Canada.
Donnelly, Dan A., Sandy Hill Iron and Brass Works.
Douglas, R. B., Ohio Knife Co.
Dalrymple, Wm., Lee Paper Co., Vicksburg, Mich.
Dowley, Ernest, B. F. Nelson Manufacturing Co.
Duncan, A. C., Paper Makers Chemical Corp., Portland Ore.
Dozier, Lewis, Rhinelander Paper Co., Rhinelander, Wis.
Dieffernderfer, J. C., Paper Makers Chemical Corp., Easton, Pa.
Dix, Lawton A., Paper and Industrial Appliances, New York.
Dodge, Geo. W., Paper and Industrial Appliances, New York.
Denison, V. S., Beloit Iron Works.
Dickson, J. D., R. T. Vanderbilt Co., Norwalk, Conn.
Devine, B. A., Mueller Brass Co., Port Huron, Mich.
Docherty, George, Holyoke Wire Cloth Co., Holyoke, Mass.
Dowd, A. Scott, The Paper Industry, Chicago, Ill.
Draper, Chas., The Draper Manufacturing Co., Port Huron, Mich.
Dumas, P. H., Chrome Plating Co., Inc., Wausau, Wis.
Dow, Joseph H., Castle & Overton, Inc., New York.
DeZurik, David, DeZurik Shower Co., Sartell, Minn.
DaFoe, C. M., Standard Oil Co., Grand Rapids, Mich.
Dilley, R. C., American Box Board.
Doty, L. M., Escanaba Paper Co., Escanaba, Mich.

E

Eliason, Harry, Johaneson, Wales & Sparre, Inc., New York.
Ehrisman, H. O., The Foxboro Co., Akron, Ohio.
Eminger, Robert L., National Secretary-Treasurer, Miamisburg, Ohio.
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Ekholm, K. L., National Aniline Chemical Co., New York City.
Enderlein, G. F., Mosinee Paper Co., Mosinee, Maine.
Elsner, W. W., Fox River Wire Cloth Works, Inc., Appleton, Wis.
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Egan, R. J., Bulkley, Dunton & Co., New York.
Ellis, Chas. L., Downingtown Manufacturing Co., Downingtown, Pa.

F

Fishburn, Victor E., Burgee Cellulose Co., Freeport, Ill.
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Fulton, W. F., American Brass Co., Detroit, Mich.
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Ferguson, E. M., Horton Manufacturing Co.
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Fuller, A. E., Gilman Paper Co.
Frisbie, Leroy, Westfield River Paper Co., Russell, Mass.
Fish, James, Paterson Parchment Paper Co., Trenton, N. J.
Fisher, O. F., Bryant Paper Co., Kalamazoo, Mich.
Freas, Herbert F., Spaulding Fibre Co., Inc., Tonawanda, N. Y.
Fortune, Samuel J., Rochester Paper Co.
Fitzgerald, L. E., Paper Makers Chemical Corp., Kalamazoo, Mich.
Frampton, Charles, California Fruit Wrapping Mills, Pomona, Calif.
Frampton, Frank, Hopper Paper Co., Taylorville, Ill.
Foxgrover, J. A., Paper Makers Chemical Corp., Kalamazoo, Mich.
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Eamer, D. W., Rolland Paper Co., Mt. Rolland, Quebec.
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Fussell, O. P., Lawess Bros, East Rochester, N. Y.

G

Gilman, E. H., Watervliet Paper Co., Watervliet, Mich.
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H

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Holderbee, Mr., State Board of Health, Wis.
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Hays, A. E., Michigan Paper Co., Kalamazoo, Mich.
Hansen, A. B., Northern Paper Mills, Green Bay, Wis.
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I

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Johnstone, Lockport Felt Co., Newfane, N. Y.
Jacobi, E. C., Standard Oil Co., Green Bay, Wis.
Johnson, E. A., National Aniline and Chemical Co., Chicago, Ill.

K

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Kinney, C. E., Hercules Powder Co., Wilmington, Del.
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L

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Lagarstrom, T. E., International Nickel Co., Inc., New York, N. Y.
Lane, O. F., Krebs Pigment & Color Corp.
Lehman, A. H., Productive Equipment Co., Chicago, Ill.
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Logus, Charles L., Corn Products Refining Co., Riverside, Ill.
Langston, B. W., Samuel Langston Co., Camden, N. J.
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Lesperance, Edward, F. Raniville Co., Grand Rapids, Mich.
Lahl, W. F., Crane Co., Chicago.
Lillie, F. R., Crane Co., Chicago.
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Lind, Larry, R. T. Vanderbilt Co., Kalamazoo, Mich.
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Lawrence, M. L.
Land, Harry L., River Raisin Paper Co., Monroe, Mich.
Lagerloef, Jerry, Lagerloef Trading Co., New York City.

M

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Montgomery, A. E., J. O. Ross Engineering Corp., New York.
Monaghan, E. J., du Pont de Nemours & Co.
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Mohr, J. S., Chromium Corp. of America.
Macklem, Wm., Black Clawson, Hamilton, Ohio.
Maye, Mr., Appleton Wire Works, Inc., Appleton, Wis.
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Murphy, F. S., Lockport Felt Co., Appleton, Wis.
Morris, C. D., Michigan Alkali Co., Chicago.
Mangreig, L. M., U. S. Rubber Products Co.
Messner, Ollie W., Robertson Paper Box Co., Montville, Conn.
Morpeth, W. R., Krebs Pigment and Color Corp.
Martz, J. A., Standard Oil Co., Chicago, Ill.
Mathias, H. R., Standard Oil Co., Chicago, Ill.
Millam, A. B., Bryant Paper Co., Kalamazoo, Mich.
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McWhirter, E., Provincial Paper Co., Ltd.
McCall, I. R., Michigan Steel Casting Co., Fansteel Metallurgical Corp.
McGovern, J. N., Forest Products Laboratory, Madison, Wis.
McMahon, C. J., Appleton Woolen Mills, Appleton, Wis.
McPhillips, A., Simonds Worden White Co., Beloit, Wis.
McFarland, A. B., L. H. Gilmer Co., Philadelphia, Pa.
MacIndoe, H. E., Wm. Cabble Wire Co., Brooklyn, N. Y.
McPherson, W. R.
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Macdonald, R. G., Technical Association of Pulp and Paper Industry.
McCormick, Daniel, Filer Fibre Co., Manistee, Mich.

N

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Nylund, J. J., General Dyestuff Corp., Chicago, Ill.
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Nason, H. E., Westinghouse Electric and Manufacturing Co., Pittsburgh, Pa., Chicago, Ill.
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Niks, N. J., Munising Paper Co., Munising, Mich.
Neihaus, H. G., Gardner-Richardson, Blookland, Ohio.
Newby, Thos. E., F. Raniville Co., Grand Rapids, Mich.

O

Owen, Harry, French Paper Co., Niles, Mich.
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O'Connor, Mr., O'Connor Seven Co.
O'Donnell, J. E., L. H. Gilmer & Co., Chicago.
O'Connell, J. H., Past National President, Hartford, Conn.

P

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Purdy, John L., The Orr Felt and Blanket Co., Piqua, Ohio.
Plank, Wm. J., Jos. J. Plank & Co., Appleton, Wis.
Putney, William G., Philadelphia Felt Co.
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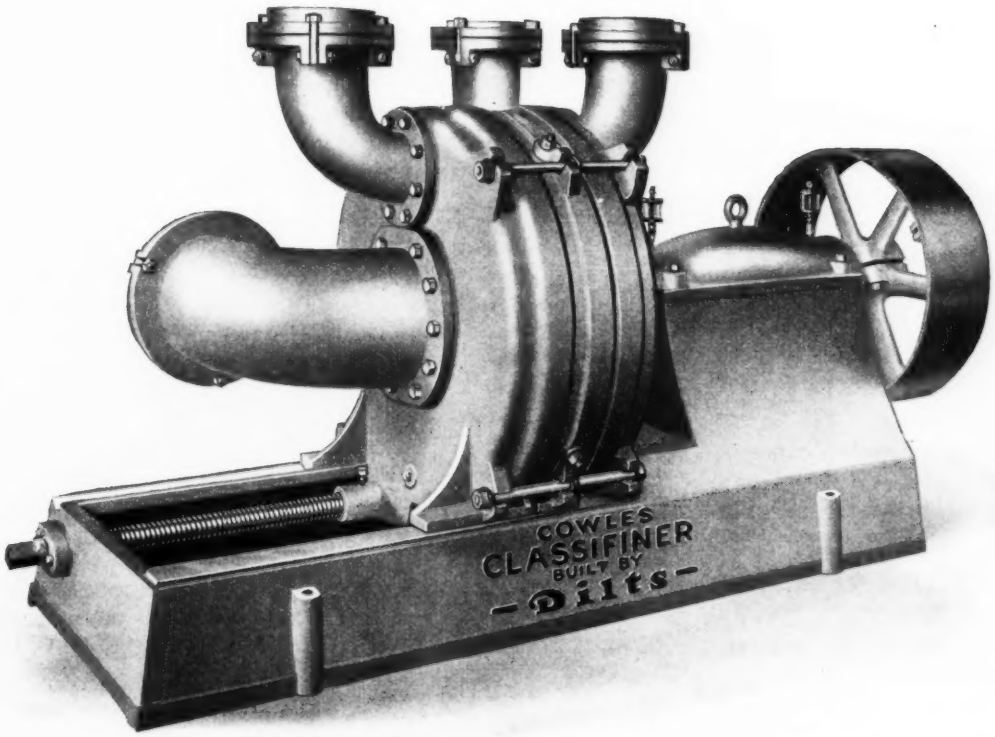

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Pulchin, F. L., Hudson Sharp Machine Co., Green Bay, Wis.

R

Roberts, T. C., Beloit Iron Works.
Rozyski, A. G., Southern Kraft Corp., Mobile, Ala.
Rozyski, Adam, Southern Kraft Corp., Panama City, Fla.
Roberts, John, du Pont de Nemours & Co.
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Reed, Robt. R., Lagerloef Trading Co., Dayton, Ohio.
Read, J. H., Wm. E. Hooper & Sons Co., Chicago, Ill.
Raber, C. F., American Box Board.
Rentrop, G. H., Westinghouse Electric and Manufacturing Co., Jackson, Mich.
Riedel, George, Tomahawk Kraft Paper Co., Tomahawk, Wis.
Raney, C. E., Monroe Paper Products Co., Monroe, Mich.
Robbins, Douglas, Douglas Robbins Sales Co.
Raines, J. W., The Lindsey Wire Weaving Co., Cleveland, Ohio.
Radsch, R. M., Appleton Machine Co., Appleton, Wis.
Rasmuson, S. M., Sylva Paperboard Co., Sylva, N. C.
Randolph, John B., The Ohio Knife Co., Cincinnati, Ohio.
Riedel, Gus, Gus Riedel & Son, Kalamazoo, Mich.
Rooney, Fred, Wisconsin Wire Works, Lockwood, N. Y.
Raniville, Frank F., F. Raniville Co., Grand Rapids, Mich.
Ritchie, W. A., Marathon Paper Mill Co., Night Hotel, Ashland, Wis.
Redmond, M. J., Kalamazoo Paper Co.
Richardson, James C., Gardner-Richardson Co., Middletown, Ohio.
Raymond, G. A., Centra Fibre Products Co., Quincy, Ill.
Rose, H. W., American Cyanamid and Chemical Corp., New York City.
Randall, H., Champion Paper and Fibre Co.
Richter, A. F., Stebbins Engineering Co., Watertown, N. Y.
Regnier, A. E., Paper Makers Chemical, Stoneham, Mass.
Rolland, Oliver, Rolland Paper Co., Mt. Rolland, Quebec.
Rausch, G. E., Interlake Tissue Mills Co., Ltd., St. Catharines, Ontario.

S

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Saladin, H., Standard Oil Co., Chicago, Ill.
Sathor, O. F., Standard Oil Co., Duluth, Minn.
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Steele, W. R., Solvay Process Co., Syracuse, N. Y.
Schenk, H. F., William A. Hardy & Sons Co.
Schuber, John, Solvay Process Co., Syracuse, N. Y.
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Smith, T. B., American Brass Co., Detroit, Mich.
Stamm, Fred C., Armstrong Machine Works, Three Rivers, Mich.
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Sharpless, Wm., Unattached.
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Staley, W. D., Duriron Co., Dayton, Ohio.
Smith, C. B., Huron Milling Co., Kalamazoo, Mich.
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Stewart, R. C., Shartle Brothers Machine Co.
Stinson, J. C., Fort Wayne Corrugated Paper Co., Hartford City, Ind.
Stamets, Oscar, Reigel Paper Corp.
Server, Herb, Northwest Paper Co., Cloquet, Minn.
Sale, John W., Hummel-Ross Fibre Corp., Hopewell, Va.
Snyder, C. C., Republic Steel Corp., Massillon, Ohio.
Smith, Frederick E., Hollingsworth & Vose Co.
Stinson, John, Eddy Paper Corp., Rockford, Ill.
Schmid, G. C., Michigan Paper Co., Plainwell, Mich.
Steele, B. P., Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Stafford, H. B., Hawthorne Paper Co., Kalamazoo, Mich.
Spencer, George H., E. Jones & Sons Co., Pittsfield, Mass.
Sisson, C. F., MacSinBar Paper Co.
Schmidt, J. Carl, DuPont Co.
Suminski, Mitchell, Marathon Paper Mills, Ashland, Wis.
Shaw, Wm., Michigan Carton Co., Battle Creek, Mich.
Sargent, John J., Jenkins Bros., Chicago.
Snyder, W. T., American Cyanamid and Chemical Corp., Kalamazoo, Mich.
Stansel, E. L., Provincial Paper, Ltd.
Stansell, J. Howard, West Carrollton Peli. Co., West Carlton, Ohio.
Simpson, J. R., Champion Paper and Fiber Co., Hamilton, Ohio.
Staidl, J. A., Thilmany Pulp and Paper Co., Kaukauna, Wis.
Stoke, C. E., Tomahawk Kraft Paper Co., Forrest Place, Tomahawk, Wis.
Sinclair, Peter S., The Sinclair Company.
Scott, W. H., Duriron Company, Dayton, Ohio.
Stansel, E. L., Provincial Paper, Ltd.
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Smith, A. F., General Electric, 215 W. 3rd Cincinnati, Ohio.
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Sprang, R. J., Champion Fibre Co., Canton, No. Carolina.
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Stewart, Robert, K. V. P. Co., 120 Glendale Blvd., Parchment, Mich.
Sligh, E. M., Sonoco Paper Co., 7 Springgarden, Grantford, N. J.
Sutton, Glen, Sutherland Paper Co., Kalamazoo, Mich.
Schroeder, J. I., Am. Cyanamid & Chemical Corp., New York City.

T

Tigwell, P. H., Beloit Iron Works, Beloit, Wis.
Trimbey, Roger, Trimbey Machine Works, Glens Falls, New York.
Turner, E. A., International Nickel Co., Inc., New York City.
Telder, Fred, General Electric Supply Corp., Kalamazoo, Mich.
Thompson, M. J., Standard Oil Co., Grand Rapids, Mich.
Thompson, L. J., Standard Oil Co., Grand Rapids, Mich.
Thompson, Geo. A. Jr., B. F. Perkins & Son Inc., Holyoke, Mass.
Turner, M. W., Shartle Bros. Co.
Toughead, Joseph E., Joseph E. Toughead Co., Kalamazoo, Mich.
Thom, E. J., Howard Smith Paper Mills Ltd., Montreal, Canada.
Teter, W. H., The Mead Corporation.
Turner, J. A., DuPont De Nemours & Co., 7 So. Dearborn St., Chicago, Ill.
Terry, K. E., S. D. Warren Paper Co., 175 Mason St., Cumberland Mills, Maine.
Timmerman, F. J., Northern Paper Mills, Green Bay, Wis.
Taylor, Wm. S., American Cyanamid & Chemical Corp., Kalamazoo, Mich.
Tomczak, S. E., Fambeau Paper Co.
Timia, P. Y., General Electric Co., Grand Rapids, Mich.
Toole, Harry J., Pagel Horton Co., New York.

U

Ulrich, H., Carborundum Co., Grand Rapids, Mich.
Ulrich, P. L., Armstrong Machine Works, Three Rivers, Mich.

V

Vicario, Carl, Nash Engineering Co., New York City.
Van Nort, J. L., Reliance Electric and Engineering Co., Chicago.
Vanderberg, H. L., Staley Sales Corp.
Van Kirk, R. W., Penick & Ford Ltd., Evanston, Ill.
Vinton, H. K., PAPER TRADE JOURNAL, Chicago.
Van Der Karr, O. M., French Paper Co., Niles, Mich.
Verdon, L. R., American Cyanamid and Chemical Corp., Kalamazoo, Mich.
Velton, H. J., Askania Regulator Co., Chicago, Ill.
Van Peenan, R. W., R. W. Van Peenan, Kalamazoo, Mich.

W

Williams, J. J., Halifax Paper Corp., Roanoke Rapids, N. C.
Wickham, Almeron W., Mac Andrews & Forbes Co., Camden, New Jersey.
Williams, Jack Jr., Halifax Paper Corp.
Wandtke, A. P., Heller & Merz Corp.
Weston, Harry, The Paper Industry, Chicago.
Winslow, H. B., H. H. Robertson Co.
Wright, J. A., American Brass Co.
Wettlaufer, O. A., Chromium Corp. of America, Chicago, Ill.
Whittiger, Frank A., Ciba Company, Chicago, Ill.
Williamson, Bill, Shuler & Benninghofen, Portland, Oregon.
Wright, J. G. Jr., A. M. Meinche & Son, Inc., Chicago, Ill.
Wood, Edward P., Pulp Division—Weyerhaeuser Timber Co.
Walker, Geo. K., Finch, Pruyn & Co., Glens Falls, New York.
Waymire, W. E., Westinghouse Mfg. Co., Appleton, Wis.
Wright, J. B., Nash Engineering Co., South Norwalk, Conn.
Walton, Clifton, Downingtown Mfg. Co.
Weber, H. F., Link-Belt Co.
Weil, Norman O., W. S. Tylor Co.
Wedgwood, John, Manhattan Rubber Co., Appleton, Wis.
White, W. L., Raybestos Manhattan.
Wertzel, C. F., Penn. Salt Mfg. Co., Philadelphia, Pa.
Woollam, A. E., A. E. Woollam Co., Kalamazoo, Mich.
Wells, Sidney D., Consulting Engineer.
Wilmot, Nelson F., Mathieson Alkali Wks., Chicago.
Walton, Wm. F., Chromium Corp. of America.
Weston, W., American Wringer Co., Syracuse, N. Y.
Wilberg, A., Gilbert Paper Co., Neenah, Wis.
Woodhead, R. M., Gilbert & Nash Co., Menasha, Wis.
Wise, J. A., Kalamazoo Paper Co., Kalamazoo, Mich.
Wheeler, H. R., Victoria Paper Mills Co., Fulton, New York.
Weiser, L. E., Nat'l Folding Box Co., Hamden, Conn.

Y

Yordy, John F., Howard Paper Co.
Yule, B. A., F. C. Huyck & Sons.
Younchild, J. W., Internat'l Paper Co., Fort Edwards, New York.
Yoder, A. T., Ontonagon Fibre Corp., Grand Rapids, Mich.
Yoder, Jay A., Ontonagon Fibre Corp., Grand Rapids, Mich.
Young, G. H., Mid West Fulton Mach. Co., Dayton, Ohio.
Yonkers, J. L., Sound Engineering Corp.

Z

Zellers, Robert, French Paper Co., Niles, Mich.
Zellers, F. L., French Paper Co., Niles, Mich.

Ladies in Attendance

Mrs. F. L. Zellers, Miss Thelma Zellers, Mrs. J. W. Younchild, Mrs. John Wedgewood, Mrs. W. F. Walton, Mrs. Wettlaufer, Mrs. A. Wiberg, Mrs. K. E. Terry, Mrs. F. J. Timmerman, Mrs. Wm. S. Taylor, Mrs. J. Stinson, Mrs. L. E. Smith, Mrs. C. B. Smith, Mrs. Oscar Stamets, Mrs. Harold Sinclair, Mrs. J. P. Strasser, Mrs. J. Carl Schmidt, Mrs. J. C. Stinson, Mrs. Lester J. Smith, Miss Helen Redmond, Mrs. R. M. Radsch, Miss Jesse Reitz, Mrs. Jacob Parent, Mrs. K. Pattilloch, Mrs. H. A. Pratt, Mrs. C. J. McMahon, Mrs. Katherine McPherson, Mrs. A. McPhillips, Miss Leona M. Messner, Mrs. Mangrieg, Miss M. F. May, Mrs. I. S. Mohr, Mrs. John Murray, Mrs. Leroy Frisbie, Mrs. Lawrence Lynd, Mrs. Roy H. Kelly, Mrs. M. J. Ketter, Mrs. L. F. Knickerbocker, Mrs. F. I. Jacoby, Mrs. E. C. Jacobi, Mrs. S. W. Jackson, Mrs. F. C. Jones, Mrs. Treff Imbleau, Mrs. T. Ireland, Miss Dorothy R. Hayes, Mrs. Roy Holden, Mrs. Ronold W. Hynes, Miss Dorothy Harris, Mrs. Alan H. Griffin, Mrs. L. L. Griffiths, Mrs. H. L. Garvins, Mrs. A. E. Fuller, Mrs. O. F. Fisher, Miss Luwanna Frampton, Mrs. Frank Frampton, Mrs. L. E. Fitzgerald, Mrs. Marie Tesmoile, Mrs. Herbert F. Freax, Mrs. S. J. Fortune, Miss Virginia Fortune, Mrs. Geo. A. Engart, Mrs. F. B. Eilers, Mrs. Robt. Eminger, Mrs. E. E. Earhart, Mrs. Lewis Dozier, Mrs. V. S. Denison, Mrs. Katherine DeLeeuw, Mrs. P. H. Dumas, Mrs. M. J. Cady, Miss Frances Champion, Mrs. Chas. Champion, Mrs. R. M. Cook, Mrs. Mae Callighan, Mrs. W. A. Crawford, Mrs. W. H. Croft, Miss Elsie Costello, Mrs. L. H. Bidwell, Mrs. Gordon W. Booth, Mrs. E. N. Bechard, Mrs. L. H. Breyfogle, Mrs. Helen E. Burrows, Miss Vera Brady, Mrs. G. D. Baber, Mrs. F. H. Bither, Mrs. W. H. Boyd, Mrs. Chas. L. Bauer, Mrs. W. H Brydges, Mrs. S. R. Atkinson, Mrs. L. C. Beighey, Mrs. E. W. Bush, Mrs. E. Y. Burkhalter, Mrs. N. J. Cowie, Mrs. R. J. Egan, Mrs. O. P. Fussell, Mrs. Robert Gillespie, Miss Graham, Miss Joan Hawkins, Miss Joyce Anne Hawkins, Mrs. Violet Hawkins, Mrs. John H. Hayes, Mrs. Guy C. Howard, Mrs. A. B. Hansen, Mrs. H. D. Jones, Mrs. F. H. Knowlton, Mrs. B. L. Kassing, Mrs. Edw. Lesperance, Mrs. Daniel McCormick, Mrs. R. W. Meyer, Mrs. W. H. Monsson, Mrs. C. H. Nofter, Mrs. V. B. Nickerson, Mrs. Robert J. Nichols, Mrs. I. J. Nylund, Mrs. Thomas Newby, Mrs. Wm. J. Plank, Mrs. C. E. Stoke, Mrs. Peter S. Sinclair, Mrs. P. H. Tigwell, Miss Nancy Vetter, Mrs. J. G. Wright, Jr., Mrs. A. P. Wendtke, Mrs. H. R. Wheeler, Mrs. John F. Yordy, Mrs. W. W. Fitzgerald, Mrs. Al Sherwood.

DO YOU KNOW..

IT COSTS MORE TO REPACK A PUMP THAN THE PRICE OF THE PACKING ITSELF

Experience has shown that the labor charge, the time wasted, the stoppage of production, far outweigh the actual cost of the packing.

If the engineer does it on his own time, he will surely be interested in using a packing that gives long service.

TO SOLVE THIS PROBLEM WE OFFER

CUTNO PACKING

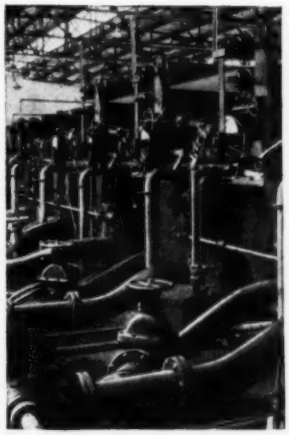
For Caustic-Soda Pumps.

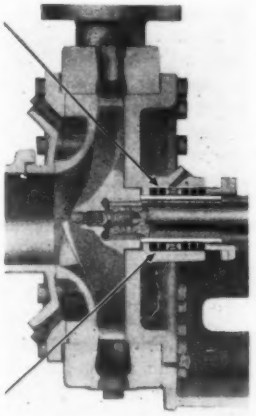
"Cutno," an asbestos packing designed for pumps handling caustic soda and similar alkalis, as it carries a special compound, forced hot into each single strand before braiding, that resists the cutting action of these fluids.

SQUARE ODORLESS TASTELESS STAINLESS KLERO PACKING

No graphite in its lubricating compound.

"Klero" is made of high-tensile-strength cotton, carrying a lubricant that has no graphite in it, and is designed for stock pumps and Jordans, where no impurities should work their way into the finished product.





Send for complete A B C chart of packing services, also free sample for actual working test. State size of packing and conditions of service.

GREENE, TWEED & CO.

(Sole Manufacturers)

109 Duane St. New York, N. Y.

Container Corp. Resumes Common Dividend

Quarterly of 25 Cents Declared, Payable August 15 to Stock of Record July 25—President Walter P. Paepcke Declares Records Show June Will Be Best Month So Far This Year In Orders, Shipments, and Profits Earned

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, ILL., June 29, 1936—The Container Corporation of America resumed common dividends with the declaration last week of a quarterly dividend of 25 cents, payable on August 15 to stock of record of July 25. The last previous payments were 30 cents quarterly, paid on January 1, 1931, on the Class A common stock, and 15 cents quarterly, paid on April 1, 1929, on the Class B common then outstanding. The Class A common stock recently was exchanged, share for share, for the present common stock.

Commenting on the company's business, Walter P. Paepcke, president, said the records showed that June had reversed the usual seasonal trend and would be the best month so far in 1936 in orders received, shipments made and profits earned.

The reduction in the price of number one and two grades of sulphite bond is reported to have had little or no effect on the general paper market in Chicago. Virtually all lines were reported steady to firm with demand slowing up appreciably. There is still a predonderance of opinion that an impressive pick up in business may be noted after July 4 and mill representatives and jobbers here are shaping their policies to that end.

Aside from the quarter of a cent reduction in sulphites the market was colorless. Krafts remained about the same with demand slackening. Groundwood reports were encouraging despite seasonal retardation. Mills were running at a fair capacity. Newsprint activities were curtailed although the political news is doing its bit to enhance the demand for this product. Fine papers in general were unchanged. Books were not so active as last week while cover papers were quiet pending the renewal of business advertising programs. Waste papers were about the same.

News of the Industry

From Peoria, Ill., comes two interesting news items involving members of the paper industry. The Terre Haute Paper Company has recently resumed operations after a considerable lay off and the concern, located on Alexander street in Peoria, is now producing an appreciable quantity of cushion centers for use in various types of corrugated containers.

Late last month the John C. Streibich Company, for many years a leading Peoria paper and stationery house, staged a "Modern Business Show" which attracted some comprehensive exhibits from members of the paper industry including the Brown Company, Nekoosa-Edwards Company, Howard Paper Company and the Union Bag and Paper Company.

Although the record breaking attendance at the golf outings of the Salesmen's Association of the Paper Industry remains unshattered, Burt Fisher, hard working golf chairman of the Midwest Division, did succeed in getting more than sixty golfers to participate in the second of the summer series which was staged Friday, June 26, over the long and arduous Bob-o-Link Golf Club course. The Bergstrom Paper Company sales representative again lined up an interesting luncheon event and dinner program and topped it all off by issuing a goodly number of prizes to the winners of the many and varied events. The next outing of the season is scheduled for July 24 with the Knollwood Country Club as the host course.

The "Modern Business Show" was announced with the aid of a sensational ten page advertising program in the Sunday edition of the *Peoria Journal Transcript* and brought thousands of interested Peorians to see the modern developments in the field of merchandising and advertising promotion in which paper and paper products play a most important part. The event is reported by the Peoria Association of Commerce as one of the most successful ever held in that city.

The Heco Envelope Company, Chicago, sends out an interesting message concerning "What the Well-Dressed Mail is Wearing." The mailing follows its predecessors in that it cites actual examples of the experiences of well known business organizations with respect to their mailing problems. In this way the company is, of course, contributing materially to the drive of the paper industry to obtain recognition of the value of the use of quality papers in all kinds of business purposes.

A newcomer in Chicago and in the Conway Building, headquarters of a goodly share of the paper interests in this city, is L. E. Delson, of the Miami Coated Paper Company, who takes an office at 111 West Washington street to forward the promotional facilities of Miami in this territory.

The Supreme Court decision with respect to minimum wages has had the effect in Illinois of providing what amounts to an injunction with respect to the enforcement of the Illinois law. A suit as to the constitutionality of the Illinois law was filed some time ago but is now being held up at the suggestion of the Illinois court which is anxious to review any possible re-trial of this case in the Federal Courts. While the case is being held up Illinois employers understand that no action will be taken with respect to the operation of the minimum wage law in this State.

E. A. Julius, former manager of the J. W. Butler Paper Company, is the purchasing agent of the Chicago Park District, an organization created out of a consolidation of all the park districts of the city. The former paper company executive is active in the affairs of the Chicago Purchasing Agents Association.

The Dwight Brothers Paper Company has been appointed exclusive agent in the Chicago territory for the Resource Bond line manufactured by the Gilbert Paper Company.

Fletcher & Ellis, Inc., Chicago advertising agency, has been reported as handling the advertising account of the Mosinee Paper Mills Company, of Mosinee, Wis.

J. H. Coy, Flambeau Paper Company sales executive, returned on June 24 after a trip through the central western sales territory. Mr. Coy left Chicago on June 12 visiting accounts in Ohio, Michigan and other points. His return in time for the monthly golf outing assures the Salesmen's Association of the Paper Industry of a capable leader for its evening song fest, the genial former president of the SAPEYES being a most effective song leader and songster in his own right.

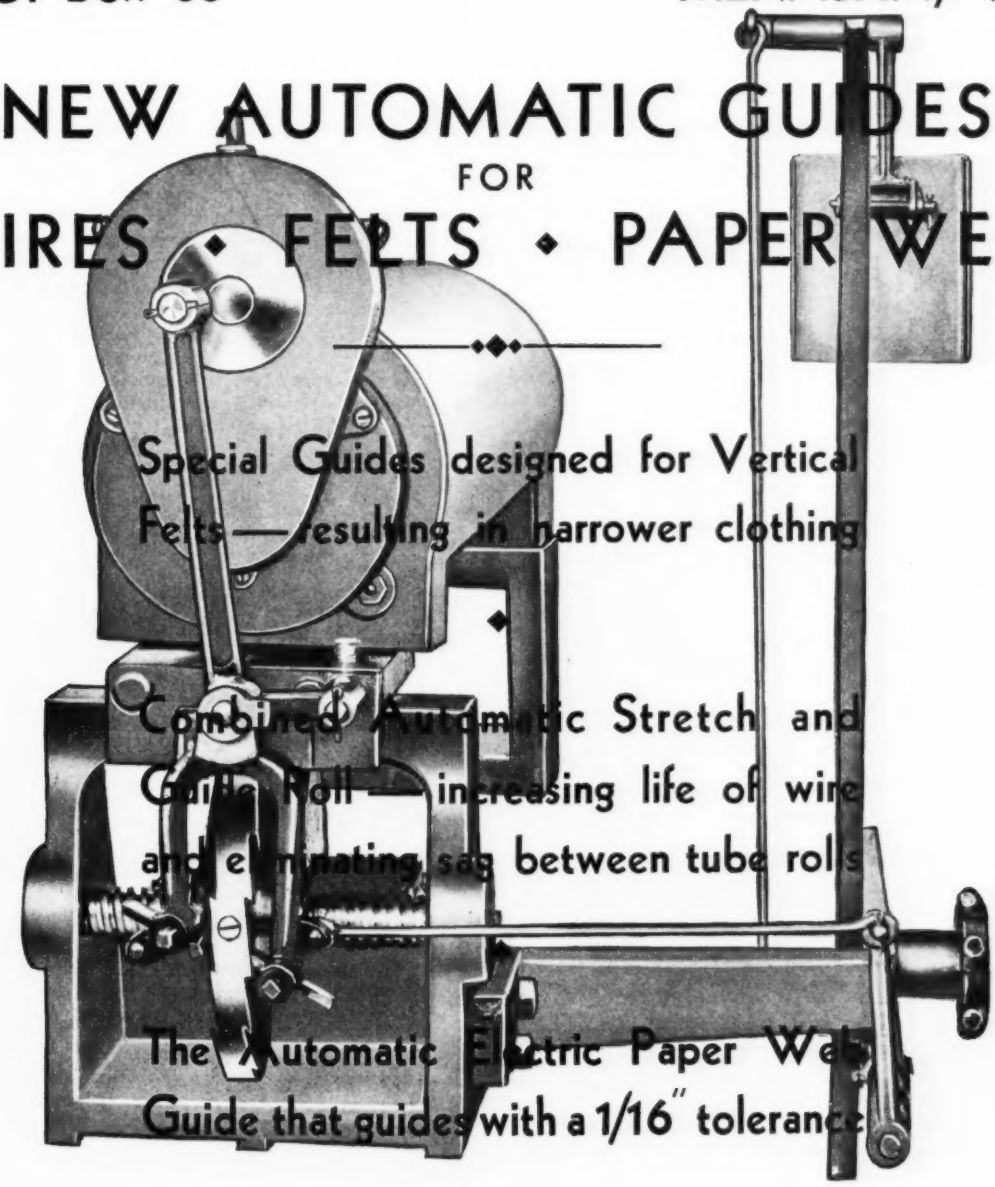
GILBERT & NASH COMPANY

P. O. Box 86 MENASHA, WIS.

• NEW AUTOMATIC GUIDES •

FOR

WIRES • FELTS • PAPER WEBS



Special Guides designed for Vertical Felts—resulting in narrower clothing

Combined Automatic Stretch and Guide Roll—increasing life of wire and eliminating sag between tube rolls

The Automatic Electric Paper Web Guide that guides with a 1/16" tolerance

EQUIP YOUR GUIDES WITH OUR NEW PALM SUSPENSION THAT INCREASES LIFE OF MACHINE CLOTHING

Ontario Paper Co. Project Proceeding Rapidly

More Than 1,000 Workers Engaged In Preliminary Work On Huge Newsprint Hydro Electric Townsite Development At Comeau Bay, Que.—Machines Costing $2,000,000 for Big Newsprint Paper Mill Already Ordered

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, QUE., June 29, 1936—What is described as the largest new industrial enterprise in the Dominion is the newsprint—hydro-electric—townsite development now being undertaken at Comeau Bay, on the north shore of the Lower St. Lawrence, some 160 miles below Quebec City. More than $6,000,000 was spent on the project before work began this year, and it is estimated that another $12,000,000 will be spent in the next two years. Those in authority for the company are said to believe that the project is likely to cost upward of $30,000,000 before it is completed.

Operations Going Forward Rapidly

Operations are now going forward rapidly. About 1,200 men are at present being employed in the various operations to clear the land for the townsite, build wharves, lay sewage, and blast away rock. Temporary houses for the workers have been erected as well as a number of large dwellings for engineers and officers engaged in the work.

As a result of the program of construction, with 2,500 square miles of timber limits situated in the area due north of the present development, the *New York News* and the *Chicago Tribune* (with which Ontario Paper Company is affiliated) expect to be independent of outside sources of newsprint supplies. Freighters owned by the company will be able to carry newsprint economically and direct to Chicago and New York via the St. Lawrence route.

In addition to the huge newsprint mill now being erected, for which machines costing $2,000,000 have been ordered from the Dominion Engineering Company and 5,000 tons of structural steel from the Dominion Bridge Company, plans are already in effect to build a hydro-electric plant with a capacity of 60,000 h.p. The model town that is to be built will eventually be populated by about 5,000 people, according to the plans of the company.

Following the practice adopted by the company of awarding contracts, wherever possible, with companies in Canada, particularly the province of Quebec, the latest contract for the construction of a modern staff house and hospital was awarded to the Foundation Company, of Canada, Montreal. Other contracts just let include one to John F. Wickenden of Three Rivers, for the construction of single and double type houses, and Gagnon and Freres of Matane, Que., to build one double type number-two house, three double type number-three houses and three number-five houses.

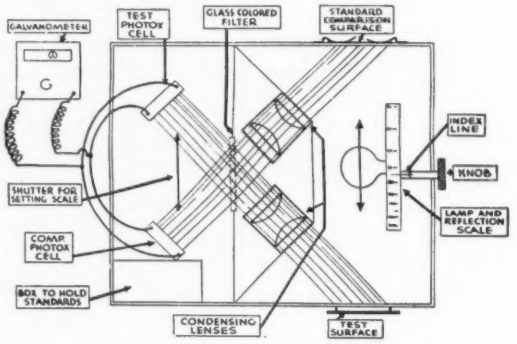
The Foundation Company, who are the general contractors for the whole development, in addition to the latest contract for hospital, etc., are presently engaged in the construction of the principal streets of the town, water, sewage and electrical systems. Officials of the company report that hundreds of extra workmen will be taken on before the year is out, while transportation facilities along the St. Lawrence are being steadily employed in greater number to convey men and materials to the site of the work.

Price Bros. Rehabilitation

Following the court judgment quashing the so-called shareholders' plan for the re-organization of the big newsprint and lumber firm of Price Bros. & Co., the opinion is expressed here that the rehabilitation of the company now rests solely upon the alternate plan of refinancing which the Pacona interests have admitted will soon be ready to submit to the trustee-in-bankruptcy. This proposal, it is said, will entail a proportion of new free shares to the shareholders in addition to an invitation to preferred and common shareholders to participate on a pro-rata basis in the refinancing.

Photoelectric Reflectometer

A new photoelectric reflectometer which measures the reflectance, opacity and color of paints, papers, pigments, powders, ceramic products, textiles and chemicals has been placed on the market by the Henry A. Gardner Laboratory, Inc., 2201 New York avenue, N. W., Washington, D. C. This new reflectometer is a photoelectric adaptation of the Hunter Visual Reflectometer first described in 1934. The photoelectric instrument measures the same quantities, employs the same large sample areas, and operates much faster and with higher precision than the former visual instrument.



The diagram showing the working parts of the instrument demonstrates the null method which makes it possible to operate directly from ordinary current supply. The test surface and a comparison surface are at opposite ends of a light tunnel and are illuminated by a single lamp which is movable between them. Two rectifier-type photoelectric cells are placed so that each receives light reflected at an average of 45 degrees from one of the surfaces. The two cells are connected in series and a galvanometer is connected across them to indicate when one cell generates a current greater than the other. The reflectance scale moves with the lamp past a stationary indicator.

To determine reflectances, a standard is first placed in the test end of the instrument and the lamp is moved to the position for which the scale reading gives the reflectance value of the standard. By means of a compensating shutter, the light falling on one or the other of the photo cells is then reduced until the galvanometer reads zero. When the instrument has thus been adjusted to give the correct reading for the standard, unknown surfaces may be substituted for the standard and their reflectances measured directly. To obtain color values, reflectances in colored light are determined.

● Titanox-A (Titanium Dioxide) easily solves the problem of increasing the opacity of sheets without increasing their weight.

It has the highest index of refraction of all the white pigments and a very small quantity produces an opaque sheet of remarkable whiteness and brightness.

These better qualities can be obtained without difficulty, for Titanox-A is chemically stable and inert... there are no unfortunate reactions resulting in discoloration of the sheet, regardless of pH value. Other advantages are excellent retention when used as a beater furnish addition, and ready dispersion and suspension in surface size or coating mix.

Our paper technologists will be glad to consult with you and recommend the best methods of opacifying stocks of every kind with Titanox pigments.

111 Broadway, New York, N. Y.; Carondelet Station, St. Louis, Mo.; National Lead Co. (Pacific Coast Branch) 2240 24th St., San Francisco, Calif.; Canadian Distributor: Wilson, Paterson, Gifford (1935), Ltd., 3552 St. Patrick St., Montreal; 132 St. Helen's Ave., Toronto.

TITANOX

TITANIUM PIGMENT COMPANY, INC.

Manufacturers of
TITANOX-A (Titanium Dioxide)
TITANOX-B (Titanium Barium Pigment)
TITANOX-C (Titanium Calcium Pigment)
TITANOX-L (Lead Titanate)

Wausau Paper Mills Co. Production Changes

Manufacture of Coarse Grade Wrapping Paper At Brokaw, Wis., Replaced by High Grade Sulphite Bonds—Big Filter Plant Now Ready for Use On New Grades—Capable of Clarifying Five Million Gallons of Water Daily

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., June 29, 1936—A change to high grade sulphite bonds to replace a principal output in the past of course grade wrappings is being made by the Wausau Paper Mills Company, Brokaw, Wis. To accomplish the change, the company has been constructing a new filter plant capable of clarifying 5,000,000 gallons of water daily, and it is now ready for use on the new grades.

The filters were erected in the basement of the finishing plant, and include seven steel horizontal units ten feet in diameter and thirty feet long. They are mounted on concrete bases. Gravity filtration will be used with sand layers. A large tile tank also was built to transmit the clear water to various mill departments. All of the work has been painted with aluminum.

The water has been obtained from a well with 650,000 gallons per day capacity, and the remainder from the Wisconsin River. The discoloring has been reduced from approximately 200 parts per million to five parts by the new filtration equipment.

Kimberly-Clark Rebuilds Rate Structure

In conferences conducted for two weeks at the E. R. A. building, Neenah, Wis., between representatives of the employees of each of its mills and the management, the Kimberly-Clark Corporation has rebuilt the entire rate structure for all occupations. It is said to be the first instance in which a large industrial organization has performed the technical and controversial task through committees.

Findings and recommendations were reviewed at the quarterly meeting of the mill council of employee representatives and management, in session two days last week.

The announcement issued by the company says: "This payroll revision is in no sense a wage increase, but rather an attempt to bring the rates of all jobs into proper balance with each other. Present rates that were found to be above the newly established model rates will not now be reduced. Such reductions will be accomplished through normal turnover as time goes on."

The plan contemplates the following:

1. Putting rate setting problems on an impersonal basis, thus eliminating prejudice and favoritism.
2. Providing for organized, uniform methods and standards for gauging job importance.
3. Enabling elected representatives and management to share in rate determination, thereby promoting pooled judgment and understanding.
4. Balancing payrolls, not only within a single mill but as between mills.
5. Recognition will be given differences in merit as between occupations, and the plan aims to establish rates of pay in proper relation to responsibility.

The work or rate setting accomplished during the conference is built upon two and a half years of cooperative job analysis and job classification within all departments and mills of the corporation. The goal has been to rerate all jobs in accordance with relative worth to the corporation, disregarding precedent, tradition and inheritance. More than 2,400 hours of time were consumed in formal classification, and approximately 750 separate jobs were segregated and analyzed. Jobs of equal importance were grouped into families, and these families took their places on the classification ladders of the several divisions of the business. The analysis did not deal with the persons on any job.

News of the Industry

Sale of the Grandfather Falls dam on the Wisconsin River near Tomahawk, Wis., to the Wisconsin Public Service Corporation has been approved by the Wisconsin Public Service Commission, following hearings in Madison. The dam was owned by the Grandfather Falls Paper Company, Merrill, Wis., and was sold for a consideration of $400,000. The utility will make improvements at the dam costing $68,610. Acquisition is part of a general plan for increasing power facilities which the corporation expects to carry out by 1941.

In an order dated June 18, the Wisconsin Tax Commission denied the application of the Consolidated Water Power and Paper Company for a re-assessment of real and personal property at Wisconsin Rapids, Wis., for the year 1935, but ordered a new assessment to be made for the year 1936 under supervision of the commission. The Consolidated company, in a recent hearing, attempted to show that its 1935 assessment of $3,642,000 was excessive for the mill property, which it fixes at $2,540,000 in value.

Howard B. Richmond, manager of the Consolidated Water Power and Paper Company's mill at Stevens Point, Wis., has been appointed production superintendent at the main mill at Wisconsin Rapids, Wis. He assumed his new duties last week. G. D. Muggleton, formerly production superintendent, has been transferred to the sales department.

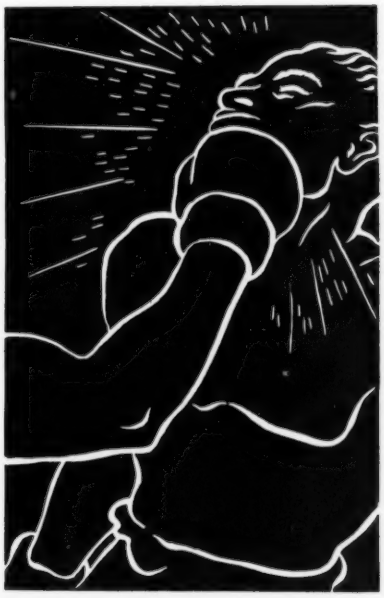
Products of the Marathon Paper Mills Company, with mills and converting plants at Rothschild, Ashland and Menasha, Wis., were displayed during the Wisconsin Centennial Exposition at Madison, Wis. Representative samples were arranged to tell a story of the paper industry and the conversion of paper into napkins, cartons and other products of this firm.

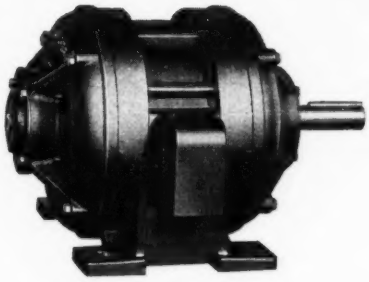
Miss Jessie Darling, of Waupaca, Wis., has been added to the secretarial staff at the Institute of Paper Chemistry, Appleton, Wis., succeeding Miss Charlotte Peterson, who was married recently to Philip Nolan. Miss Darling was graduated from Lawrence College, Appleton, this month. Miss Dorothy Fischl has been appointed as secretary to Dr. Henry M. Wriston, president of Lawrence College and director of the Institute, to handle secretarial work relating to the Institute.

Dr. Stephen Kukolich, of Toltec, Colo., and Miss Helen Werner, of Appleton, Wis., were married June 20 at the First Presbyterian Church, Appleton. Dr. Kukolich is a graduate of Grinnell College, Grinnell, Iowa, and has been attending the Institute of Paper Chemistry, Appleton, where he received his doctor of philosophy degree this month. He will be employed as research chemist at the Neenah Paper Company, Neenah, Wis. His bride was assistant librarian at the Institute. The couple left on a honeymoon trip to Colorado, and will reside at a summer home at Lake Winnebago, near Neenah.

Wanted . . .

A MOTOR THAT CAN *TAKE IT!*





THIS wasn't a request by a customer, it was a demand made by our own organization, thirty years ago.

The machinery that we were building was designed for the toughest jobs and was easily equal to them. But we required a motor that could take the beatings that many of these applications required and measure up to the standards that Allis-Chalmers engineers demanded.

So, through our electrical department, working in conjunction with all the highly specialized knowledge of all our various departments, we developed a motor distinctly designed for severe industrial duty. A motor sturdy enough to be a counterpart to our own vast line of rugged power driven machinery.

That motor met the exacting demands of our engineers thirty years ago. For thirty years engineering experience and knowledge have been advancing rapidly and each step of that advance, whether minute or revolutionary, has year after year painstakingly been incorporated in Allis-Chalmers Motors. That is why they are the sturdiest motors on the market—bar none.

Today Allis-Chalmers Motors are the most profitable motor buy on the market because their great mechanical strength reduces maintenance costs to the minimum and extends their life beyond that of all less sturdily constructed motors.

The Allis-Chalmers Mfg. Co. builds standard motors of every type from 1 hp. up—also motors for special application

MOTOR DIVISION

ALLIS•CHALMERS

MILWAUKEE WISCONSIN

Boston Paper Business Fairly Favorable

Demand for Various Standard Grades of Fine Paper Generally Well Sustained, Despite Slight Summer Slump—Inquiries for Future Needs Numerous—Volume of Wrapping Paper Sales Considered Satisfactory for Season

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., June 29, 1936—Business Among Boston paper wholesalers was fairly favorable during last week, with improvement in some quarters. At one fine paper house it was stated that business was holding up fairly well, although there was a little of the summer slump. With this company, the first six months of the year was the best six months for a long time. At another fine paper house, sales kept up, but there was not so much business for out-of-town shipments. Smaller orders, on which there is more profit, were missing. This firm is figuring on many large inquiries. In wrapping paper lines, the volume of sales was rather good. Box board was quiet, so many box factories were closing or preparing for their annual shut-down of a week or so.

Paper Stock Market Quiet

The paper stock market was generally quiet. With the beginning of the summer season, sales have fallen off to some extent. A downward revision has taken place in most of the commodities whose values have changed, although a few advances have been made. In old papers, kraft corrugated boxes rose to .95@1.00 from .90 to .95. In bagging, jute rope declined to 1.90@2.10 from 2.00@2.25, scrap sisal for shredding to 2.10@2.25 from 2.10@2.35, Australian wool pouches to 2.25@2.50 from 2.30@2.60, heavy baling bagging developed a wider range to 1.75@.10 from 1.95@2.00, paper mill bagging declined to 1.65@1.70 from 1.75@1.85, and bagging No. 2 to 1.10@1.25 from 1.15@1.40.

New Domestic Rags Unchanged

New domestic rags were unchanged in price. In old domestic rags, roofing stock went down, with quotations varying in two grades. In the No. 1 grade, the decline ranged from 1.50@1.65, compared with a former quotation of 1.80@1.90. In some quarters, the range was given as 1.50@1.55 and in others 1.55@1.65. The No. 2 grade fell off to 1.30@1.35 from 1.40@1.50. In the No. 3 grade, the range of decline was 1.10@1.25, against a previous quotation of 1.20@1.25. In one case, the value was given as 1.10@1.15 and in another as 1.10@1.25.

In foreign rags, there was not much activity, as domestic rags were so plentiful and so much lower in price. Dark cottons varied in quotations given, with a general decline of 1.50@1.70 from 1.70@1.80. One authority gave 1.50@1.60 as the price, another, 1.60@1.70. Old fustians fell off to 1.75@1.90 from 1.85@2.00, old linsey garments to 1.75@2.00 from 1.90@2.10, and new silesias to 5.00@5.75 from 5.25@6.00.

News of the Industry

Albin R. Caspar, who was recently elected vice president and manager of sales of the Great Northern Paper Company, was in the Boston office of that company for seven years, as assistant manager of the manufacturing department, before taking charge of the sales work of the concern. He was appointed acting manager of sales last July following the death of H. Merton Joyce. Mr. Caspar has been with the company since his graduation from Bowdoin College in 1919. Before coming to Boston, he served as night superintendent of the East Millinocket plant of the company. Mr. Caspar is married, has two children, and resides at Old Greenwich, Conn.

T. F. Spear, mill manager of the Oxford Paper Company, Rumford, Me., was included in the panel of leading industrial executives who discussed increased production and decreased costs at the 43rd quarterly meeting of the New England Council, whose headquarters are in Boston, held at Rockland, Me., last Friday. The industrial committee of the New England Council recently conducted a poll. Among the 32 leading industrial executives who replied as opposed to the "economy of scarcity" as a cure for industrial ills were George A. Richter, research department, Brown Company, Berlin, N. H., and Benjamin H. Roberts, president, Bird & Son, East Walpole, Mass. The application of the following policy in eight New England industries which have prospered through recent years was discussed at the Rockland meeting:

"More and better production at lower costs is possible in New England. To achieve this objective more research and better management will be required of each industry. The sooner these truths are more generally recognized and accepted, the better for all of us concerned."

Winthrop L. Carter, president and general manager of the Nashua Gummed and Coated Paper Company, Nashua, N. H., and president of the New England Council, is to speak on "New England Today" at the thirty-second annual convention of the Advertising Federation of America, held at the Hotel Statler this week, with meetings continuing through Wednesday. L. S. Wright, sales promotion manager of Bird & Son, Inc., East Walpole, Mass., will be one of the speakers at the direct mail conference.

Although the fine paper department of the Boston office of Carter, Rice & Co., Corp., will be closed for business Saturdays during July and August, the wrapping paper and twine department will be open from 8:30 until 12, with all facilities available.

A son was born to Mr. and Mrs. W. M. Lincoln at the Goddard Hospital, Brockton, Mass., June 19. Mr. Lincoln, of Holbrook, Mass., who is associated with the Spaulding & Tewksbury Company, box board dealers, has been receiving the congratulations of his many friends.

Berton C. Hill, head of the Bertchill Paper Corporation, box board dealers, New York City, called on the trade last week.

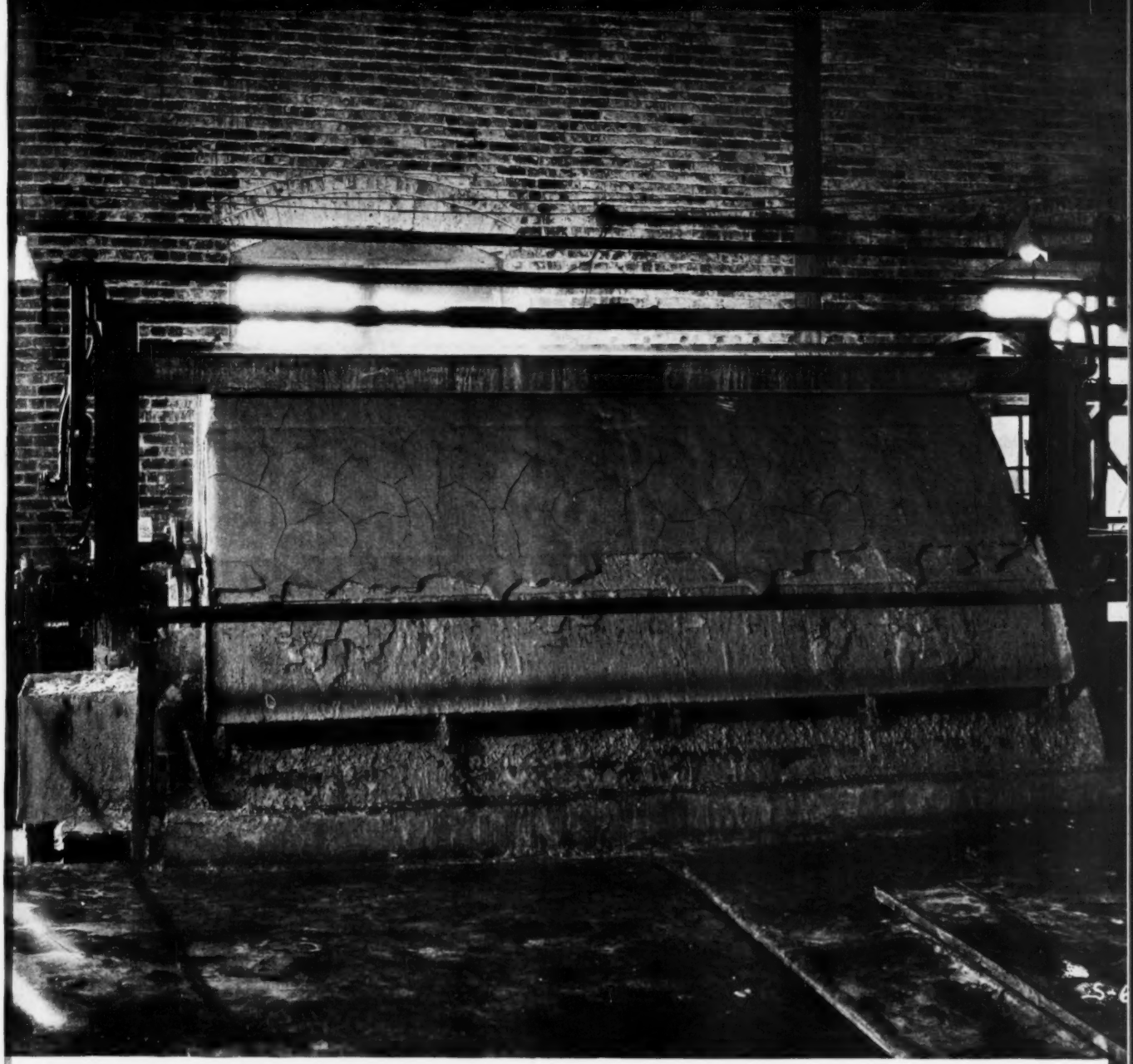
Finnish Newsprint Export Increase

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., June 29, 1936—The trend of Finnish newsprint exports to the United States is decidedly upward according to a report from Consul A. E. Gray at Helsingfors.

Last year exports to the United States amounted to about 60,000 metric tons and it is anticipated that they will reach 100,000 tons this year. In this connection it is reported that large orders have been placed for Finnish newsprint by a representative of one of the leading newspaper chains in the United States, the order which this group placed last year having proved entirely satisfactory.

SWENSON



NOW A COMPLETE LINE OF FILTERS

● Swenson engineers have for many years designed and built filter equipment for the process industries. In the last few years a special Filter Dept. has been organized under the direction of an experienced filter engineer and a complete line of rotary vacuum as well as pressure filters has been developed. Suitable designs are available for paper and pulp mills, beet sugar mills, cane sugar refineries, oil refineries, chemical plants and for filtering sewage sludges. ● The same complete service — from blue print to finished operating installation — that has characterized Swenson performance in the evaporator field, is your guarantee for a completely satisfactory job. Let us study your filter problems.

SWENSON EVAPORATOR COMPANY

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EVAPORATORS — FILTERS — CRYSTALLIZERS

Ontario Paper Mills Only Moderately Active

Machines Manufacturing Fine Papers Are Very Little Ahead of Orders—In Some Cases, Difficulty Is Being Experienced In Keeping Machines Operating—Coarse Paper and Paper Bag Conditions Reported Unsatisfactory

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., June 29, 1936—Re-arrangement of the tariff, the holiday season and more or less generally unsettled business conditions have combined to reduce somewhat the volume of trade in wholesale paper circles. The Canadian Paper Trade Association reports business as rather dull with demand light and buying on a rather small scale. It is not estimated that conditions will brighten much now that the summer and holiday seasons are on, for experience has shown that the average purchaser and consumer of paper turns his thoughts to vacation about this time to the detriment of paper sales. However, the paper merchants of Ontario have been doing very well up to the present quiet period and they are confident business will be there to greet their return from the summer holidays.

In the meantime, pretty much the same conditions exist in the mill end of the industry. Machines manufacturing fine papers are very little ahead of orders and in some cases some difficulty is being experienced in keeping the machines operating, although salesmen and distributors are doing their best to feed the mills substantial orders. The market generally is firm with no price changes. Competition is keen in most branches of the paper trade, including the light weight paper market which is fairly firm despite the race for orders among the tissue manufacturers in the province and beyond.

There has been little change in the paper converting trade and there exists only a moderate demand for envelopes, blank books and general stationery which make up the paper converter's lines. A fairly good market exists for waxing glasine and greaseproof lines and flour sacks are selling well despite the fact that the general bag situation and coarse papers generally are not entirely satisfactory. Paper box firms and corrugated paper manufacturers are fairly busy and are enjoying a nice turnover.

Pulpwood Situation Steady

Pulpwood operators report that the demand for wood at mills in and around Cochrane and other centres in the pulp and paper industry in Northern Ontario is steady, but that prices are too low, which simply means covering costs with a very moderate remuneration for supervision activities. Pulpwood for outside mills is still limited so far as requisitions are concerned, and what is disposed of is at prices that leave this type of Northern wood turnover at the foot of the list from the standpoint desirability on the part of both operator and laborer.

One leading pulpwood operator declares that the chief cause, so far as the North is concerned, is the freight cost of $6.50 to $12 per cord to Niagara and Northern American mills, as against the rate by water of $2.50 to $3.50 a cord. He is of the opinion that Northern Ontario producers will have to consider the movement of pulpwood to the former consuming centres as a part played in history, unless some Government grants a concession in the matter of transportation charges or reduces radically the present high freight rate.

Notes and Jottings

Stauntons, Ltd., wallpaper manufacturers, Toronto, have purchased five acres of land, having a frontage of 371 feet on Vanderhoof Avenue, Leaside, outside Toronto, and will erect thereon a new factory plans for which are being drawn by Mathers & Hodenby. Over 300 men will be employed and work is to be commenced at once for operations which will start in the fall.

There were over forty contestants in the golf play for the Howard Smith trophy at the Summit Golf Club, Toronto, last week, in which the paper mills defeated the paper merchants and thus annexed the prize which was won by the paper merchants last year. Harold Crabtree, president of the Howard Smith Paper Mills, donor of the trophy, presided at a dinner following the match. The cards turned in showed J. H. Chipman, Toronto, the winner of the low gross and George A. Davidson, Montreal, winner of the low gross.

F. S. Duncan, president of Provincial Paper, Ltd., has been confined to his residence in Toronto for several weeks.

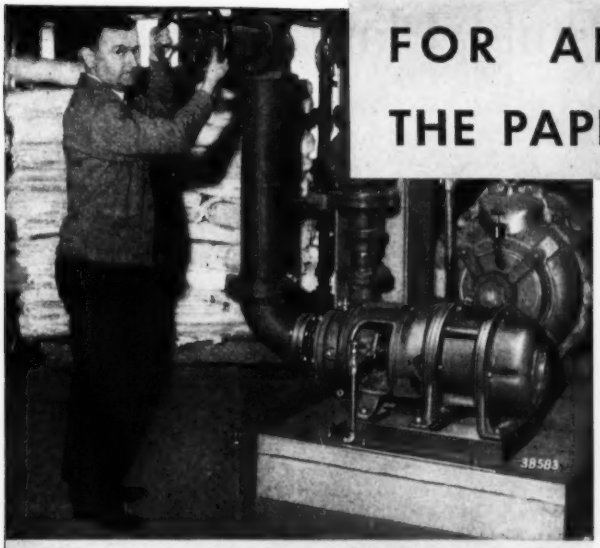
Superior Box Company, Ltd., Waterloo, Ont., manufacturers of corrugated shipping containers, plain and fancy paper boxes, etc., are building a reenforced concrete addition to their plant in order to increase their productive capacity. The addition is 75 x 130 feet and will accommodate a printer slotter and a splitter creaser. It is hoped to have the addition complete and new machinery in operation by September.

The firm of J. H. McNairn, Ltd., manufacturers of waxed paper, have moved from 7 Jarvis street, Toronto, to 468 King street West. The company, who are the oldest manufacturers of waxed paper in Canada, was established in 1882 and have occupied the same location practically all the time since then.

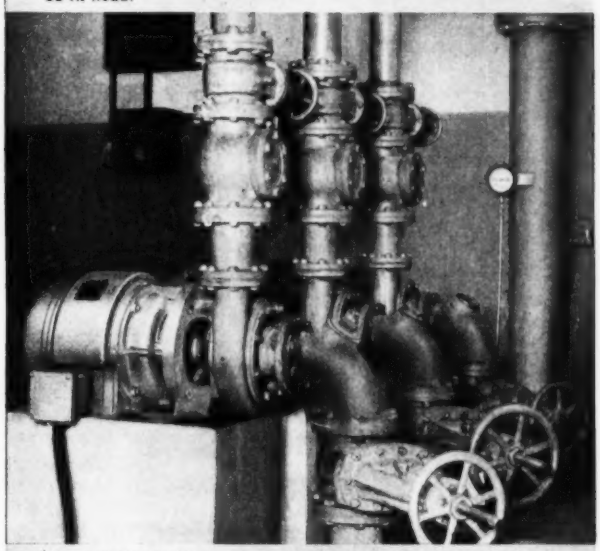
It is learned that the Iroquois Falls plant of the Abitibi Power and Paper Company is producing currently at the rate of 625 tons of newsprint daily. The plant is stated to be booked with orders far in advance. This is considered one indication of the progress enjoyed by the industry in Canada at the present time which has lifted output in this country to new high records. Last week a report came that Price Bros. & Co. plants were operating at capacity and that operations at plants of other companies were being speeded up.

Bathurst Power and Paper Company, Ltd., have commenced operations on the company's cylinder machine for the manufacture of box board. This unit, which trims a sheet 127 inches wide, and with a capacity of 100 tons daily, ranks as one of the largest machines of its kind in operation in Canada. During the past few months the unit has been completely reconditioned for the manufacture of box board. In addition to this unit there is in operation in the plant a fourdrinier kraft machine with a present capacity of 130 tons daily of liner board and corrugating materials, and an ultimate capacity of 170 tons. It is also intended to recondition the present newsprint machine in order to commence operations a little later of 70 tons per day capacity.

FOR ALL-ROUND UTILITY THE PAPER INDUSTRY PREFERS



A No. 3 RV-10 MOTORPUMP installed in a Maine paper mill. This pump handles 500 gallons per minute of white water against 55-ft. head.

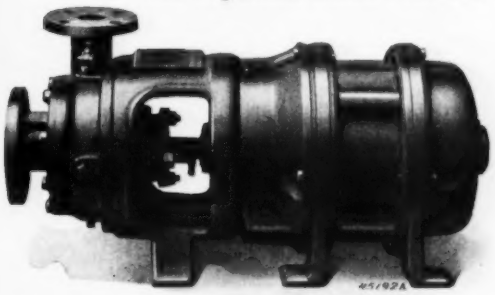


Three 4RVL-25 Motorpumps pumping water in a large Maryland paper mill. Each of these units is rated at 700 gpm. against a total head of 100 feet.

The Cameron

MOTORPUMP

-An Ingersoll-Rand Product

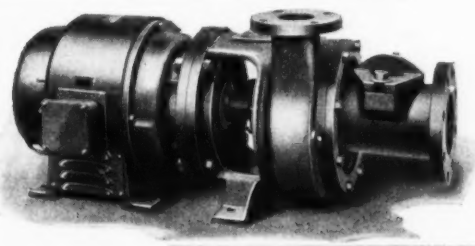


SINCE its addition five years ago to the already well-established line of Cameron pumps, the MOTORPUMP has become increasingly popular with the pulp and paper industry throughout the country.

It is preferred because of such features as compact design, rigid construction, high efficiency and its ability to operate in any position.

It is built in sizes from ¼ to 40 hp., in capacities from 5 to 1000 gpm. against heads up to 500 feet. Open, splashproof, totally enclosed fan-cooled, explosion-proof, and marine type motors are available for all the usual current conditions.

THE OPEN IMPELLER MOTORPUMP FOR HANDLING PAPER STOCK



FOR PAPER STOCK SERVICE

The Cameron open impeller MOTORPUMP overshadows the field of smaller paper stock pumps because of its greater adaptability and flexibility. Its construction embodies a handhole suction piece and a two-vane impeller.

Motorpumps are available for immediate shipment.

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Denver
Detroit
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Philadelphia
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Pittsburgh
Pottsville
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Ingersoll-Rand

342-9 CAMERON PUMP DIVISION

11 BROADWAY, NEW YORK, N. Y.

Scott Paper Co. to Build Plant Addition

Preliminary Steps to Main Construction Now Being Carried Out—Stone & Webster, Paper Mill Engineers, in Charge of Work—Equipment and Paper Stock of Reading Paper Mills Auctioned Off for Approximately $56,000

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., June 29, 1936—Pilings are being driven into place for the construction of foundations in connection with an addition to be built for the plant of the Scott Paper Company at the foot of Market street, Chester, Pa.

Underpinning for the structure is being carried out as a preliminary step to the main construction, a full permit for which will be sought when the completed plans are placed in the hands of building inspector, James Devlin.

The work is in charge of Stone and Webster, construction engineers who two years ago accomplished the building of a large addition to the plant which was constructed along lines of futuristic exterior design so much used in larger buildings of the present era in central Europe.

Reading Paper Mill Auction

The paper items of the Reading Paper Mill at Reading, Pennsylvania, were auctioned off on Tuesday, June 16. It is reported that there were 230 tons and about fifty bidders from New York and Philadelphia, as well as from Reading. The total paper bids amounted to about $16,000. Branded lines of merchandise sold at prices up to about 4½ cents for the more desirable items, and down to about 2 cents for the odds and ends. The large lots were bid in by the Midwood Paper Company of New York. Penn Card and Paper Company of Philadelphia, Van Reed Paper Company of Reading, and Goldman Paper and Stock Company, of Philadelphia, bought in substantial lots. The Paper House of Pennsylvania, 28 North 6th street, Philadelphia, purchased several substantial lots of Gainsborough, Louvaine and Lorentian.

On the equipment, which was auctioned off the following day, June 17, the Dill & Collins Company bid in a number of items. W. C. Hamilton & Sons bid in one of the machines, and several dealers in second hand machinery bid in the rest. The total sale price was about $56,000. There were no bids for the real estate. The sale was submitted to the Federal Court in Philadelphia on Saturday, June 19, for approval. At that time two other offers were presented for the business as a whole, including the real estate. The Court took this under advisement, decision to be handed down later.

Regional Offices Established

In a letter under date of June 25, addressed to Mrs. Doris E. Lewis, executive secretary of the Paper Trade Association of Philadelphia, W. L. Dill, Regional Director of the Social Security Board, announced that Regional Offices have been established at 1516 Widener Building for the purpose of decentralizing the work of the Social Security Board in Washington in such a way as to promote efficiency and economical administration of the provisions of the Social Security Act. The office will have a staff of experts and specialists on unemployment compensation, public assistance, and the Federal Old Age Benefit Insurance. All the employees of the Regional office will be under Federal Civil Service, as required by law under the Social Security Act.

Says Mr. Dill: "Associated with me in the management of the Philadelphia office will be Harry K. Sorensen, assistant director, and we stand ready to cooperate with you at any time and in every way possible.

"We are particularly desirous of forming close contact with organizations such as yours in order that the Regional Office, through the medium of your organization, can be of assistance to members of the industry in connection with all problems growing out of the Social Security Act and its administration. We would, therefore, appreciate it if you would inform your members of the establishment of this office and would also be grateful if, at the same time, you would convey to them our sincere desire to have the Regional Office become a clearing house for suggestions, advice, assistance and helpful criticism on the subject of the Social Security Act."

News of the Industry

The annual outing of the Huff Paper Company was held over the week-end of June 20-21 at the summer home of Mr. and Mrs. Walter Taney, Crystal Beach Manor, Maryland. Ideal weather prevailed and everyone participated in sports with the keenest zest. The fortunate winners were: Golf: F. T. Hufnal; Tennis: H. A. Donnelly; Quoits: H. L. Adler; Diving: H. R. Maloney; Rowing: Tie between W. Taney and W. B. Brendel; Swimming: Miss Grace Smiley; "Hi Li": Mrs. H. L. Adler; 100 yard dash: Miss Miriam Rohr. Mrs. F. T. Hufnal with David and Edmund, Mrs. H. A. Donnelly with Shirley and Harry Jr., Mrs. Walter Taney and Miss Elsie M. Hewett were among the spectators of the sports' activities. It was unanimously agreed that Mr. and Mrs. Taney proved to be the perfect host and hostess.

Joseph Miller, of Garrett-Buchanan Company, in his capacity as chairman of the Writing Paper Committee of the Paper Trade Association of Philadelphia, attended the meeting of the Writing Paper Committee of the National Paper Trade Association held in New York on Wednesday, June 17.

At a meeting of the Philadelphia Trade Association Executives, held during the week in Architects Building, Mrs. Doris E. Lewis, executive secretary of the Paper Trade Association of Philadelphia, was admitted to membership.

George K. Hooper, president of the Philadelphia Paper and Cordage Association has sent out a call for a meeting of the Board of Directors and those interested in the welfare of the association, to be held on Tuesday, July 7 in the Drexel Building. Information regarding this meeting may be had from E. K. Lay, 939 Drexel Building.

Demand in both divisions of the paper trade here—fine and coarse—continues fairly active, and sales and output are expected to continue to record gains which have maintained over so long a period.

American Box Board Co. Files

WASHINGTON, D. C., July 1, 1936—The American Box Board Company has filed an application with the Securities and Exchange Commission for the registration of the following of its securities on the New York Curb Exchange; 125,363 shares of $1 par value common stock issued and 7,000 shares of $1 par value common shares unissued. The Commission has not yet acted on the application.

They're doing it with . .

VERIGRAPHS

"Pre-humidified" papers, recently announced by W. C. Hamilton & Sons, are produced on four machines equipped with VERIGRAPH Moisture Controllers. Paper of any desired moisture content can be produced to suit the humidity conditions under which it will be printed. Curl, buckle and shrinkage due to improperly controlled moisture, are headaches of the past.

Moisture control of paper has been made an established fact by the VERIGRAPH. In over 40 different paper mills, more than 65 Verigraphs are installed and in actual use. Only *successful performance* could account for this wide acceptance.

FOXBORO
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THE FOXBORO COMPANY, 112 NEPONSET AVE., FOXBORO, MASS., U. S. A.

COMPLETE PULP AND PAPER MILL INSTRUMENTATION

Provisions of the Robinson-Patman Bill on Prohibition of Price Discrimination

Charles W. Bryce, executive secretary of the American Paper and Pulp Association has prepared the following summary of the Robinson-Patman Bill which was enacted in the closing days of the last session of Congress:

Memorandum on Amendment to the Clayton Act Approved June 19, 1936, Embodying Prohibition of Price Discrimination

This amendment to the Clayton Law is in the form, first, of a very broad prohibition against price discrimination, followed by certain qualifying provisions, to which have been added in separate subdivisions additional specific prohibitions against certain types of discrimination. There are next included certain procedural provisions with respect to pending cases. This in turn is followed by another general prohibition against being a party to a discriminatory transaction, providing criminal penalties for violation. The final provision exempts certain distributions of a cooperative association from the operation of the act.

Eliminating language, unnecessary to this analysis, the broad prohibition is as follows:

(Sec. 2-a) That it shall be unlawful directly or indirectly to discriminate in price between different purchasers of commodities of like grade and quality where such commodities are sold for use, consumption or resale within the United States *and* where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly or to injure, destroy or prevent competition with any person who either grants or knowingly receives such discrimination or with customers of either.

This broad general prohibition is then qualified by several provisos, as follows:

1. That the amendment shall not prevent differentials which make *only due* allowance for differences in the cost of manufacture, sale or delivery resulting from the different methods or quantities in which such commodities are sold or delivered.

2. That the Federal Trade Commission may, after due investigation and hearing, fix and establish quantity limits where it finds that available purchasers in greater quantities are so few as to render differentials on account thereof unjustly discriminatory or promotive of monopoly and differentials may not thereafter be based on differences in quantities greater than those so fixed.

3. That the amendment shall not prevent selection of customers in bona fide transactions and not in restraint of trade.

4. That the amendment shall not prevent price changes in response to changing market conditions or marketability of goods, such as but not limited to depreciation of perishable goods, obsolescence of seasonal goods, distress sales under court process or sales in good faith in discontinuance of business.

Subdivision (b) of this Section provides that where there is proof at a hearing of a discrimination, the burden of rebutting the prima facie case by showing justification shall be on the person charged with a violation, and unless justification shall be affirmatively shown, the Federal Trade Commission may issue a cease and desist order. This provision is qualified by the proviso that the statute shall not prevent a seller from rebutting the prima facie case by showing that his lower price, etc. "was made in good faith to meet an equally low price of a competitor" etc.

Subdivision (c) provides that it shall be unlawful to pay or receive anything of value as a commission, etc., except for services rendered in connection with the sale either to the other party or to an agent or other intermediary therein, where such intermediary is acting in fact for or is subject to the control of any party other than the person by whom such compensation is paid.

Subdivision (d) provides that it shall be unlawful to pay or contract for the payment of anything to a customer as compensation or in consideration of any services or facilities furnished by such customer in connection with the processing, handling or sale of any products unless such payment is available "on proportionally equal terms" to all other customers competing in the distribution of such products.

Subdivision (e) provides that it shall be unlawful to discriminate in favor of one purchaser against another of a commodity bought for resale with or without processing by furnishing or contributing any services or facilities connected with the processing, handling or sale "upon terms not accorded to all purchasers on proportionally equal terms."

Subdivision (f) provides that it shall be unlawful knowingly to induce or receive a discrimination in price prohibited by this Section.

Section 2 of the amendment provides that the amendment shall not affect rights of action arising under or litigation pending based on Section 2 of the Clayton Act as it existed prior to this amendment, and permits bringing into pending cases action based on any alleged violations of the amendment committed after its effective date.

Section 3 covers again a broad prohibition against discrimination and provides:

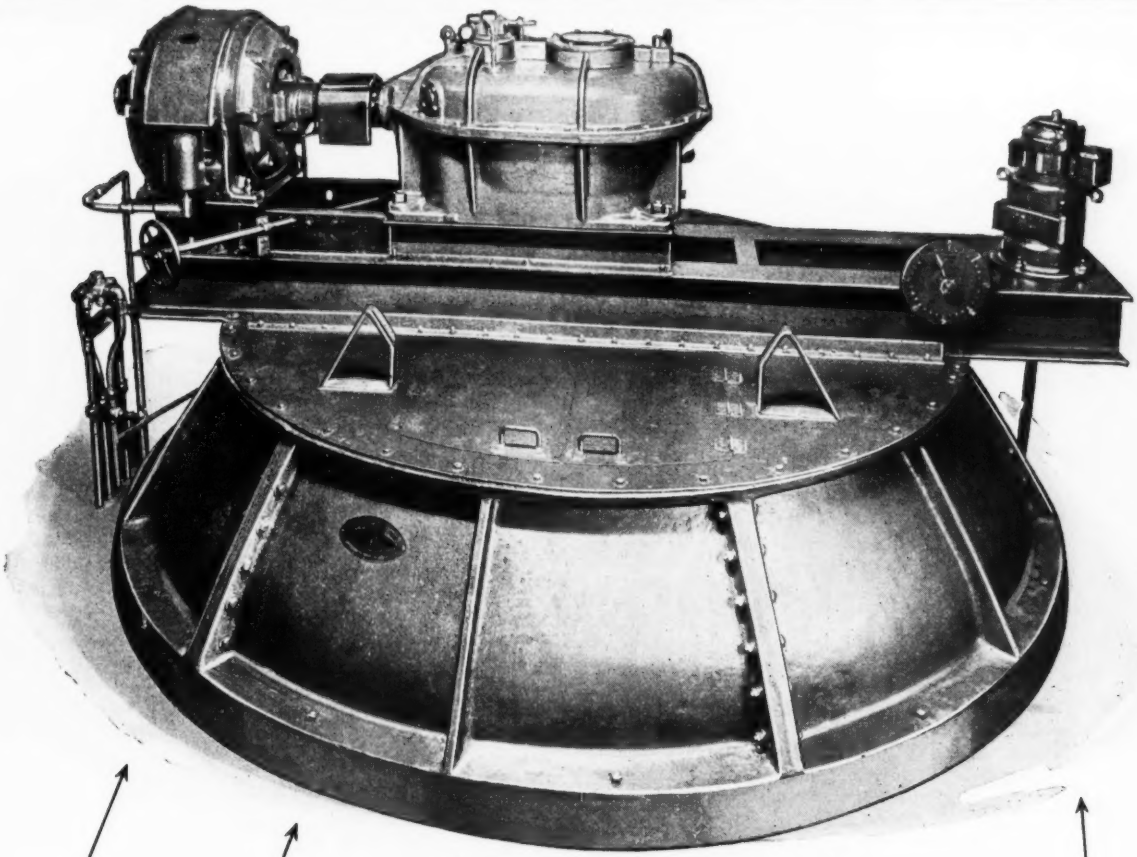
That it should be unlawful to be a party to or assist in any transaction which discriminates against competitors of the purchaser in granting any discount, rebate, allowance, advertising service charge to the purchaser over and above any such allowance available to competitors of the purchaser in respect of goods of like grade, quality and quantity. It is also made unlawful to sell goods in any part of the United States at prices lower than those exacted elsewhere for the purpose of destroying competition or eliminating a competitor in such part of the United States, or to sell at unreasonably low prices for the purpose of destroying competition or eliminating a competitor.

This Section also provides that upon conviction of a violation, any person may be fined not more than $5,000.00, or imprisoned not more than one year, or both.

Section 4 of the amendment provides that nothing in the Act shall prevent cooperative associations from returning to members, producers or consumers, net earnings or surplus in proportion to their purchases or sales from, to or through the association.

L. E. Maglathlin Joins Keith Paper Co.

TURNERS FALLS, Mass., June 29, 1936—Leon E. Maglathlin, widely and favorably known in the paper industry, on July 1 became associated with the Keith Paper Company as vice president and sales manager.



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Canadian Representatives:

Pulp & Paper Mill Accessories, Ltd., Montreal, Canada

VALLEY VORTEX BEATER

45 YEARS OF BEATER-BUILDING EXPERIENCE

Dr. West Goes to Institute of Paper Chemistry

Dr. Clarence J. West, chairman of the Committee on Abstracts and Bibliography of the Technical Association, who has been associated with the National Research Council since 1921, first as associate editor of International Critical Tables, and then as director of the Research Information Service and editor of its publications, has accepted an appointment as research associate at the Institute of Paper Chemistry, Appleton, Wis., with the title of editor. He will have charge of the publications of the Institute, including its *Abstract Bulletin* and of its bibliographic work and literature researches.

Dr. West first became interested in the work of the association through his affiliations with Arthur D. Little, Inc., with whom he became associated, as director in its Information Service, in 1919, after leaving the Chemical Warfare Service of the U. S. Army. He was appointed

DR. CLARENCE J. WEST

chairman of the Committee on Bibliography in 1920, following the late Henry E. Surface, who had done so much to start this work before his untimely death. This position he has held since that time. He has contributed annual bibliographies on paper making since 1920 and has compiled annual lists of patents since about 1927. He has greatly added to the literature of paper making by the publication of two volumes of a "Bibliography of Paper Making," the first covering 1900-1928 and the second 1928-1935. He also issued a "Bibliography of Paper Making Materials" in 1921, a revised edition of which was published by the Lockwood Trade Journal Company in 1928, as well as many bibliographies on other special subjects.

He was associated with the Committee on Classification and Definitions of Papers, appointed by the National Bureau of Standards in 1921, the report of which was published in 1924, and was the editor of the second report in 1928, the edition of which has long been exhausted.

Since his original training was in the field of organic chemistry, he early became a member of the abstracting staff of *Chemical Abstracts* and has been an assistant editor (of the Organic Section) since about 1920.

In connection with his work with the National Research Council, he has assisted in the compilation of many books and pamphlets, both of a general and a special nature. Among these may be mentioned the following: "List of Industrial Research Laboratories," the fifth edition of which appeared in 1933; "Bibliography of Bibliographies on Chemistry and Chemistry and Chemical Technology," three volumes, covering the period 1900 to 1931; "Handbook of Scientific and Technical Societies and Institutions"; "Funds Available in the United States for Research in Science and Its Technologies" (three editions); "Fellowships and Scholarships for Advanced Work in Science and Technology" (three editions); etc. He has also edited the "Annual Survey of American Chemistry," of which ten volumes have been published through the Reinhold Publishing Corporation, covering the period 1925 to 1935.

Soon after the World War he wrote, with Major-General Amos A. Fries, the first textbook on Chemical Warfare and shortly afterwards, in collaboration with Dr. G. J. Esselen, translated Heuser's "Textbook of Cellulose Chemistry."

Since receiving his Ph.D. Degree from Michigan in 1912, Dr. West has to his credit the almost unbelievable number of 550 books, articles, translations, book reviews, etc.

During his sojourn in Washington, Dr. West has been identified with the Rotary club, and has taken an active part in the Masonic fraternity, having passed the chairs in the four York Rite bodies and now occupies stations in the Grand Bodies of the Chapter, Council and Commandery.

All of his friends in and out of the paper industry wish him well in his new associations, where, as a member of the Institute, he will be in a position to contribute possibly even more to the industry than he has in the past.

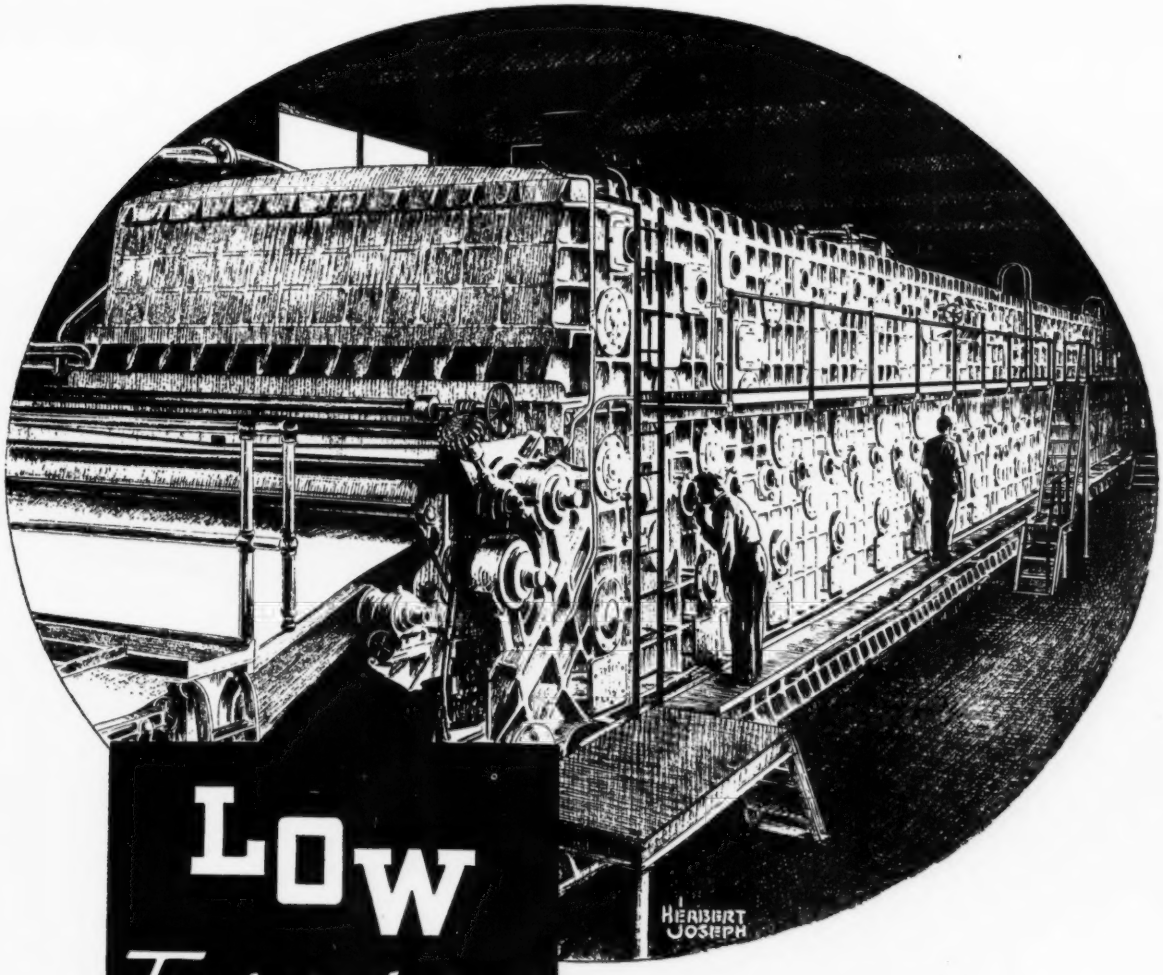
Sulgrave Dummy Selector

The Sulgrave Dummy Selector and Suggestor, just being issued by the Standard Paper Manufacturing Company, Richmond, Va., offers a valuable new service to all who plan or produce printing. There are 56 selections in the Sulgrave Dummy Service, comprising 12 Standard sizes and covering a wide range of colors and combinations of colors.

The folios represent the dummy sizes in the Sulgrave Service. They are cut to measurement, supplying you a visual selection as to size. There are 4 to 6 dummy options in each. Inside the folios are complete specifications for the dummies offered in that size. There are some with covers—others with self-covers, in finishes to suit most every technique of printing. The amount of stock required to produce 1,000 units is given, as well as other pertinent information. Immediately following the dummy folios, there is a Cross-Index for making selections as to colors, finishes and binding.

Sulgrave Dummies, produced in the same manner as a regular job, have a finish impractical in hand-made ones and better represent the appearance of the finished piece. Mounted on black mounts and wrapped in cellophane, they reach the prospective customer, unfingered and undogged. The only printing on them is the paper specifications, postage requirements, etc., which is conveniently shown on the bottom of the back page.

The Sulgrave Dummy Service is offered by paper merchants representing the Standard Paper Manufacturing Company.



LOW Temperatures

VACUUM DRIERS like that pictured above remove moisture from all Weyerhaeuser pulp at a lower temperature than would be necessary at atmospheric pressure.

EXCESSIVE HEAT is destructive to cellulose • • For this reason careful regulation of temperature is part of the intensive control exercised throughout the manufacture of Weyerhaeuser sulphite • • During cooking, bleaching and vacuum-drying processes, low temperatures are maintained • • This protects the cellulose and helps materially to preserve the high qualities of the pulp.

PULP DIVISION • WEYERHAEUSER TIMBER COMPANY

LONGVIEW WASHINGTON

Mills at Longview and Everett, Washington

WEYERHAEUSER SULPHITE
BLEACHED UNBLEACHED

"We Support Mills That Support Merchants"*

By R. W. Miller[1]

In opening this annual meeting of The Middle States Wrapping Paper Association here to-day, I am gratified, not only at the representative attendance of merchants at this particular session, but at the very large attendance of manufacturers of various lines of coarse paper who are here for the golf tournament, our entertainment this evening, and particularly for our meeting of the Paper and Twine Club tomorrow morning. It seems to me this attendance evidences the interest of both the manufacturers and the merchants in their common problem of distribution during the very trying times through which we are endeavoring to do business to-day, and I hope that throughout the session with the manufacturers, both this morning and tomorrow morning, our merchants will try and get the long view of business more than they have ever gotten it before, rather than the short-sighted, more selfish and immediate view of their problem, as represented by a single order or a single customer that may be up for consideration.

I might go on here for hours presenting to you what you already know of the problems of the coarse paper merchant in his day-to-day operation. I might mention the very low prices at which competitors are merchandising their paper and twine products, in many instances below actual cost after overhead is charged. I might mention the special terms that many of the merchants are guilty of, to their own loss and to the demoralization of the market, for the various products which we are engaged in selling, but all these things have been mentioned so frequently in the past, and apparently with little results by way of change in such practice, that I merely call your attention to your business at large and pass on to the one phase of our business which we propose to present as the major problem, together with some two or three steps which we hope the merchants will take, looking to a solution of that phase of our problem, and that is the increasing extent to which manufacturers are selling direct to chain stores, buying syndicates, mail order houses and wholesalers other than paper merchants throughout the country; and the further increasing extent to which this type of manufacturer's customer is being favored with prices, in many instances less than the paper merchant himself is able to buy the merchandise for, resulting not only in reduced volume to the paper merchant but to a less favorable basis of buying on the part of the independent retailer and small jobber than his overwhelmingly large competitor is able to buy for direct from the mill.

Merchants' Business Will Be Further Contracted

I want to call your attention to the fact that if the tide of this tendency is not stemmed very soon, the paper merchant will have his business further contracted until he might just as well buy himself a wagon or truck and go back to the peddling game in a small way, or back to the basis where many of us started in the paper business originally. As an alternative to this we may have to check out of the picture entirely.

Now, if you fellows are content to let a steam roller of this tendency on the part of manufacturers roll over you and flatten you out to the point of extinction, that, of course, is your legal and moral privilege, but I, for one, do not propose to sit idly by and permit this condition to come to pass if there is anything on God's green earth that I can do to prevent it and I sincerely hope that there are enough farseeing, aggressive and intelligent merchants in this section of the country who will stand with me in a battle for our rights and, what is far more important, what I believe to be the establishment of a truly sound principle of merchandising paper and twine products.

Problem Is Very Real

This problem is very real, gentlemen, and can be appreciated by those of you who have been in business as long as twenty to thirty years, back to the time when paper merchants sold paper and twine products to the chain stores, mail order houses and wholesale grocers, and did this job of merchandising not only in the relatively small areas which we are servicing to-day but in very many cases our salesmen traveled as far West as the Pacific Coast, as far South as the Gulf and in some instances out of this territory as far East as the Atlantic. You don't see such widespread distribution by paper merchants any more, except through the expensive medium of branch houses which practically recognize the problem by setting up separate businesses in every area which we happen to serve. We are now engaged in merchandising in a very restricted area per house, and this restriction is going to be increased if the trend of the times continues.

Now, the question is, what shall we do about it? In answer to that we may say that no house can fight this battle singlehanded. It requires a real united front on the part of all coarse paper merchants in their relations with the mills and without that united front little can be accomplished. Bear this in mind: There are very many high-grade manufacturers of paper and twine products who have endeavored to befriend the paper merchant to the point where they would decline to sell anyone except through a paper merchant, and every manufacturer selling on a policy of that character to-day is a real asset to the paper distributing trade. I might ask you what support you have given such manufacturers; how have you "played ball" with them in encouraging a continuation of this policy? There are some merchants who have loyally supported such mills but there are far too many merchants who have taken such benefits as have been extended to them by manufacturers with such a loyal policy and have then gone out and split their business, giving it, in part at least, to manufacturers who have had no merchandising policy, who have had no respect for the merchants and who have, as a matter of fact, sold to every Tom, Dick and Harry on the face of the earth and at prices lower than those at which they sold the paper merchant.

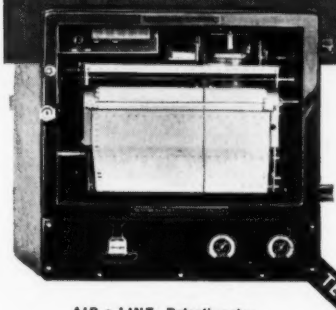
Same Excuses

In discussing this shortsighted policy with such merchants they say, "Well, they have given us a little better price than the mill loyal to the merchant" or "They have a peculiar type of merchandise which we find it easy to sell to some of our trade." In other words, they have taken the short view, overlooking the fact that by such policy they are merely encouraging the loyal mill to consider how

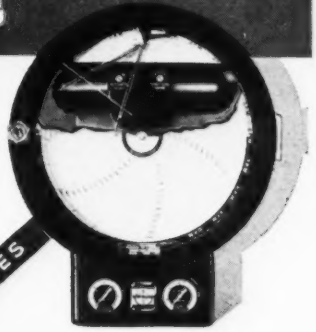
* Opening address at meeting of the Middle States Wrapping Paper Association, Granville, Ohio, June 23rd, 1936.
[1] President Middle States Wrapping Paper Association.

THE PROPER SOLUTION TO THESE CONTROL PROBLEMS IN PROCESSING

Leads to



AIR-o-LINE Potentiometer Controller combines in one instrument the measuring and recording precision of the potentiometer and the adaptability of the air operated controller with 1% to 150% throttling range and automatic reset. For temperatures—300° F. to plus 3400° F.



AIR-o-LINE pressure controllers with 1% to 150% throttling range and automatic reset are available for control of pressure within limits of 5" of water and 3000 pounds per square inch.

TEMPERATURES

PRESSURES

Air-o-Line

FLOWS

LIQUID LEVELS

AIR-o-LINE flow controllers are furnished as either electric or mechanical type flow meters with 1% to 150% throttling range and automatic reset. For working pressures up to 2500 lbs.

AIR-o-LINE liquid level controllers are furnished as either electric or mechanical type liquid level meters with 1% to 150% throttling range and automatic reset. For control of liquid levels from 20" of water to 100 feet of water.

Brown AIR-o-LINE insures accurate measurement and precise control of temperatures, pressures, flows and liquid levels in process control.

Brown AIR-o-LINE provides a means for tuning into your specific process requirements simply and quickly, without dismantling the controller or interrupting its control operation.

Operators are encouraged to secure "best possible" not just "good enough" control results, so apt to be present where adjustments are complicated and time-consuming.

Brown AIR-o-LINE is set, with the same simplicity as dialing a radio. Once it is "tuned in" it becomes fully automatic. It not only controls the process within limits, but it "lines out" control at the exact desired control point, regardless of load or throughout changes, assuring you of balanced operation—and lower costs.

Brown AIR-o-LINE has everything you have wished for in air operated control—it "recognizes," "analyzes," and "corrects" for any departure from the exact control setting—without "cycling," "drifting," or "shifting" of the control point. Modernize your process control with this modern Air-Operated Controller. Write for Catalog No. 8900. The Brown Instrument Company, *a Division of Minneapolis-Honeywell Regulator Company,* Wayne Avenue, Philadelphia, Pa. Offices in the Principal Cities; Canadian Factory, 117 Peter St., Toronto, Canada. European Address: Minneapolis-Honeywell Co., Wijdesteeg 4, Amsterdam—C.

BROWN AIR OPERATED CONTROLLERS

OUTSTANDING PERFORMANCE WITH SIMPLICITY

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In an endeavor to solve this problem we have a 3-way program which the Middle States and Tri-State Association membership are working upon to-day in very large part: First, the use of the so-called slogan sticker containing the words "We Support Mills that Support Merchants". This may seem a little long to you, but psychologically the constant hammering of this phrase by using it on all correspondence and communications with mills and other merchants should have, and has had a tremendous effect in helping to solve the problem in question. The second unit of the program is the manufacturers' selling classification schedule gotten out by the National Paper Trade Association at our request, which is being expanded at the present time through questionnaires on additional lines of manufacturers. This gives our merchants information as to the selling policies of the various manufacturers listed in order to enable them to know who are and who are not friends of the merchant. A strict adherence to the policy of buying only in the best two or three classifications so scheduled will go still further toward the solution of this problem and we see absolutely no excuse for any merchant's buying from any manufacturers listed on these schedules excepting those rated in at least the top three classifications. Now, the third point in this program is the use of the so-called conditional purchase letter. For the past two months many of us have worked diligently on this for the benefit which the individual might derive as well as to give support to those mills who have been loyal to us. Far too few of the merchants have even attempted to use the letter but many have used it and used it honestly and for the purpose for which it was intended.

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Cooperation Needed

Let me close my remarks by saying that I have tried to serve you industriously and loyally during the few months of my administration thus far, and I will continue to do so throughout the balance of the current administration year if I can get a reasonable amount of cooperation from my fellow members. If it is your desire that this association do nothing, then let's disband the darned thing and play golf or do something else, but if you really want to help remedy some of the evils such as those I have mentioned heretofore, then join with me in this program and give me that support to which I believe I am entitled as your president, then you will see distinct benefits within a very short time. I believe that most of you desire to do just that—at least I am going to continue on the assumption that I will have your co-operation and support.

Government Paper Bids and Awards

WASHINGTON, D. C., July 1, 1936—The Government Printing Office has received the following bids for 43,428 pounds (110,000 sheets) of 100 per cent rag white chart paper, lithograph finish; Reese & Reese, Inc., at 19.34 cents per pound; R. P. Andrews Paper Company, 17.17 cents; Whiting Paper Company, 19 cents; Mathers-Lamm Paper Company, 20.94 cents; and Walker Goulard Plehn Company, 21.5 cents.

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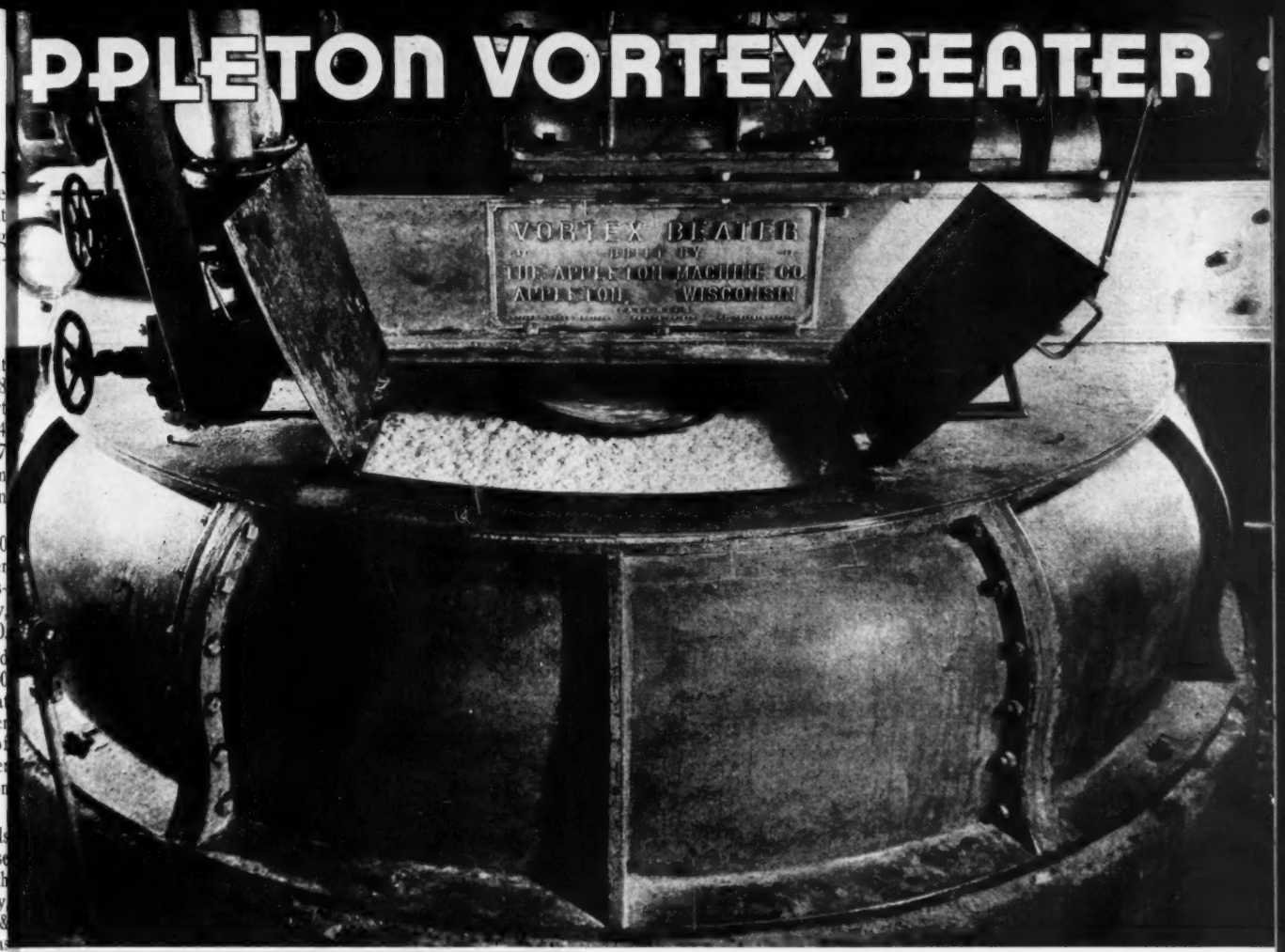

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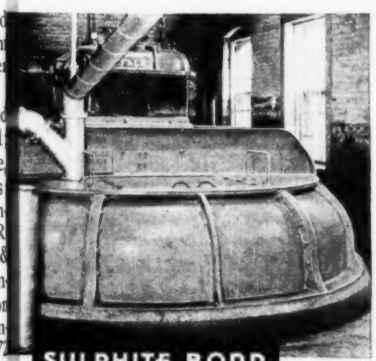
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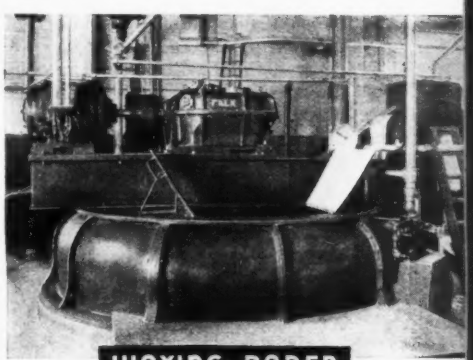
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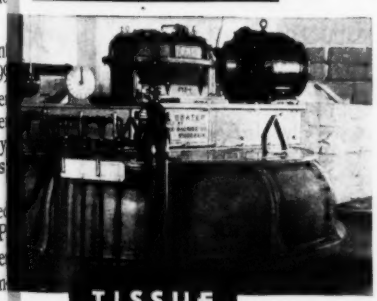
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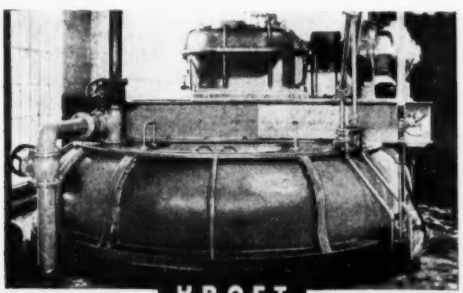
KRAFT

SPECIALTIES

THE APPLETON MACHINE COMPANY

· APPLETON · WISCONSIN ·

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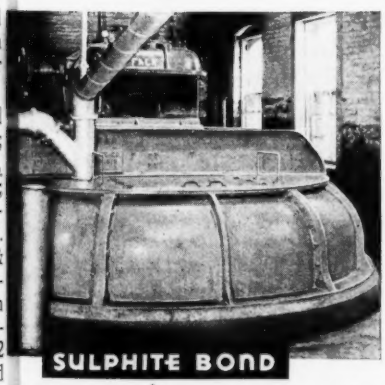
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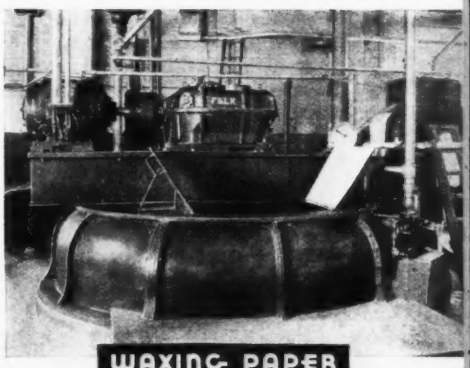
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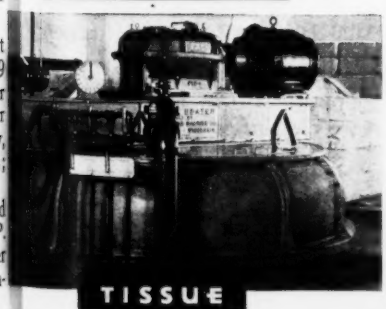
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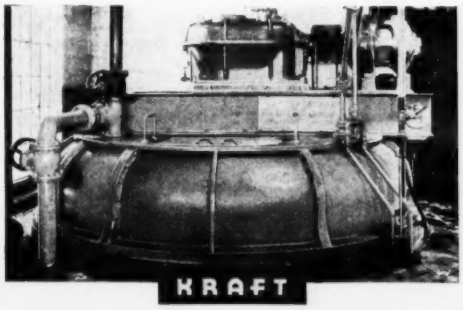
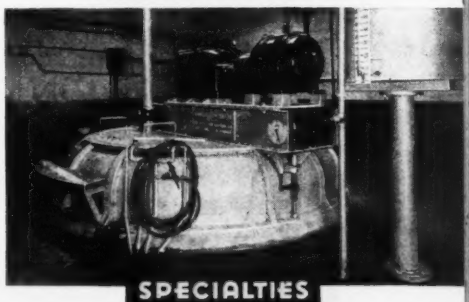

KRAFT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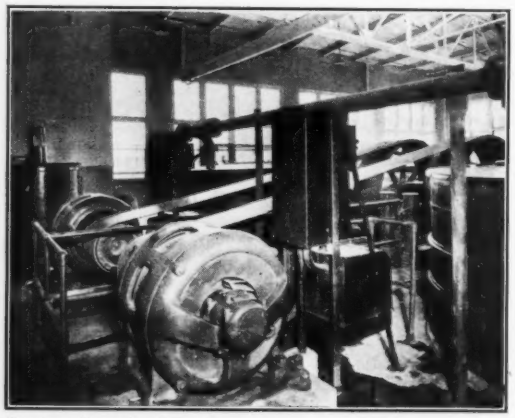
The idea was to beat in about two hours time as much stock as it had formerly taken four hours to prepare in a large Pennsylvania mill. This virtual doubling of the beater output, it was ascertained, would increase the average load on the beaters from between 45 and 60 to some 80 or 85 kilowatts and would necessitate substituting 19-inch (in diameter) motor pulleys for the 16-inch drivers in use.

So far as the increased power requirements were concerned, the plan was perfectly feasible, for the existing driving motors were well able to handle the larger loads, but the beater equipment was located in such a confined space, scarcely two inches separating the end of one beater shaft from the next, that any increase in the width of the beater driving belts was quite out of the question. The 20-inch, extra heavy, double leather belts then in use, while working satisfactorily under the lighter load conditions, could not, despite all adjustments, handle the 80 to 85 kilowatts and the unavoidable temporary overloads. A 3-ply leather belt was then tried; then a rubber belt was placed on top of the leather belts as a rider, first on the 20-inch double leather belt and then on the wide 3-ply leather belt, but even such radical steps did not suffice—the beaters stalled and the belts slipped, the service proving too severe for the best of conventional driving belts.

This was the situation in the autumn of 1934, when in October of that year an endless rubber-backed belt, 20 inches wide, carrying on its pulley side narrow, longitudinal strips of soft green leather deeply clinched to the supporting backing, was installed. The unusually high coefficient of friction of this belt produces such a powerful grip on the pulleys, with its resultant high horsepower capacity that the beater has been driven ever since at a sustained transmission efficiency of substantially 99 per cent. On the strength of this splendid showing, a similar belt, but only 18 inches wide, was placed on the adjacent beater in September of the next year and it has negotiated all overloads without apparent strain. Today the eight beaters comprising the full beater room complement, are driven by these distinctive belts and in the cases of five of the eight units, it has been possible to reduce the pulley center distances by about four feet without any sacrifice whatsoever in transmission efficiency, thereby salvaging considerable valuable floor space.



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TWO NEW HIGH-EFFICIENCY BEATER BELT DRIVES

Motor pulley, 19x20-inch face—430 r.p.m.; beater pulley, 72x20-inch face; center distance, approximately 15 feet; normal load, 80-85 kw. with frequent heavy overloads; belt on right 20 inches wide, on left 18 inches wide.

These belts have shown remarkably little tendency to stretch, the strong adhesion of the soft green leather strips on the drive pulleys cutting the belt tension required for the satisfactory operation of ordinary flat driving belts almost in half. The first belt installed was taken-up only once in over a year of operation, the driving motor then being moved back hardly an inch on the 15-foot drive.

St. Regis Reports Expanding Business

[FROM OUR REGULAR CORRESPONDENT]

OSWEGO, N. Y., June 29, 1936—Officials of the St. Regis Paper Company and Taggart Brothers, Inc., report a decided increase in business during the past year and a large appropriation is being used now for improvements. A leading official of the companies arrived here early this week and spent considerable time at the mills making an inspection. Other mills in this section were also inspected. Roy K. Ferguson, president of the company, was accompanied on the trip by B. B. Taggart, chairman of the board of directors of Taggart Brothers, and Carl B. Martin, vice president in charge of operations for both concerns.

A statement issued by Mr. Ferguson revealed that business in both groups has shown a marked increase during the past twelve months, particularly in the kraft paper and multiwall bag business, which is running at a rate of approximately 50 per cent greater than the same period a year ago. The kraft paper mills are now operating at capacity, including the large mill at Oswego which resumed operations in the winter after a shutdown of more than five years. The kraft pulp mill at Tacoma, Wash., is being placed in operation again after a long shutdown and a substantial expenditure is being made to equip that plant in a most modern manner to include the production of bleached kraft pulp. It was also stated that the use of multiwall bags in new lines is developing rapidly, particularly in the expansion of their use in the sugar industry. The company is also spending large amounts at the paper mill at Deferiet, aiming towards improvement of quality and flexibility of products.

To Build Converting Plant at Carthage

The National Paper Products Company, Division of the Crown Zellerbach Corporation, announce that work will immediately be started at their Carthage, New York mill on the erection of a new converting plant and warehouse building, and the further modernization of their paper mill and its equipment. This will complete the modernization program started in 1930 and partially completed in 1932.

The Carthage Division manufactures toilet papers and paper towels, including such well known brands as No Waste, Twin-Fold and Nata-Pak interfolded toilet papers and Public Service and Certified paper towels.

National Paper Products Company is one of the pioneers in the paper towel and toilet paper business, being the first one to manufacture and introduce folded paper towels in 1913, and shortly thereafter single fold interfold toilet paper. Always one of the leaders in the industry from the standpoint of quality, service and progressiveness, with the completion some time this fall of the above modernization program, National Paper Products Company will be able to better serve its many customers and supply the increasing demand for its numerous towel and tissue products.

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ILLUSTRATION SHOWS Bristol's Wide Strip Potentiometer Recording Tachometer, Model 18-427. This recorder may be located in the superintendent's office, while an indicating instrument may be mounted near the machine as a guide for the operator. Both recorder and indicator are operated from the same magneto on the machine drive shaft.

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The Sheet Formation on a Fourdrinier Wire*

By A. M. Lund[1]

In previous discussions of this subject *(1, 2)* the mechanical and hydraulic conditions pertaining to the sheet formation on a fourdrinier wire were discussed. The purpose of this paper is to further discuss the factors influencing sheet formation which previously have not been pointed out. In doing so, however, it will be necessary to give a short review of the basic principles from my viewpoint.

As we know, the ideal sheet forming conditions to which all paper makers are striving, would be an even flow of papermaking stock, which in all planes parallel to the wire as well as in planes vertical on the wire in the machine direction run uniformly, regardless of which percentage of drag on the wire is desired. Such conditions are far from true, however, and we all know that two horizontal planes above each other on the wire will move at different velocities, and the decided difference which prevails on most machines between the flow at the center and the edges of the sheet are easily noticeable. The reasons for this behavior are traceable directly to the design of the paper machine and the different mechanical and hydraulic conditions which are the deciding factors in the stock flow onto the wire. These may be summarized as follows:

(1) The velocity of the stock at the introduction into the head box.

(2) The design of the head box.

(3) The introduction of the stock into the slice or inlet.

(4) The mechanical adjustment of the lip of the slice.

As far as the velocity of the stock as it enters the head box is concerned, it should suffice to state that this must not be too high, with a resulting rush of cross currents in the head box. These can be eliminated only by distributing the stock mixture before it reaches the headbox proper.

* Presented at the fall meeting of the Technical Association of the Pulp and Paper Industry, Ambassador Hotel, Atlantic City, N. J., Sept. 19-21, 1935.

[1] Member TAPPI, Mill Manager, Kennebec Pulp and Paper Company, Augusta, Me.

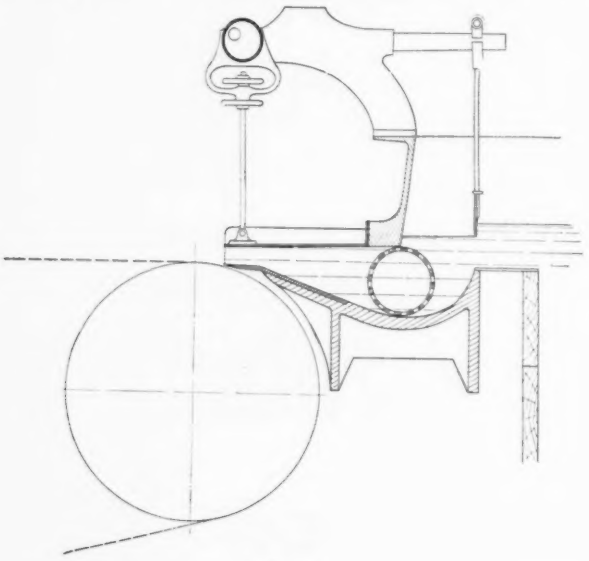

FIG. 1

The head box proper is still far from ideal, and little progress seems to have been made in regard to head box design. It is generally agreed that the old type of box with a great number of partitions should be avoided, and the modern machines, therefore, are equipped with a two-partition box of considerably greater volume than the old type box.

I believe, however, that in an effort to avoid slime accumulations the simplification of the head box has been carried too far. In none of these installations have I failed to observe a boiling effect at the last partition immediately in front of the slice. This, of course, will adversely affect the discharge conditions.

If we go outside the paper field and investigate the hydraulic principles as they are applied to hydroturbines, we will find a decided resemblance to conditions in the headbox.

It is of the utmost importance that the water approaching a turbine has an even flow free of cross-currents; and that the static head is properly transmitted into kinetic energy by contracting the area of the approach canal entering the turbine.

If we take this as a basic principle for the design of a headbox, we would obtain a headbox approximately as indicated in Fig. 1. The main parts of this consist of a distributing box with adjustable veins, which empties into the head box proper. The first partition of the box is considerably wider than the paper machine, and should be large enough to eliminate currents from the distributing box. The velocity of the stock should be kept just high enough to prevent stock flocculation. From this point on, the canal is contracting not only in the vertical, but also in the horizontal plane. This will counteract the slopping back and forth of the stock mixture which is most objectionable. I believe that this design will answer most of the criticism raised against our present head box design.

In my previous paper the hydraulic conditions of different types of stock inlets were discussed in some detail. The main point of interest at that time, was their influence on the discharge velocity of the stock, the difference in velocity at different planes parallel to the wire, and that due to the hydrostatic pressure exerted at the slices; the top or surface plane was running at a speed considerably faster than that of the bottom planes. This was found especially to be the case for the straight slice, but even with high pressure inlets this condition prevails.

To meet this condition, new inlets like the R. Wood and the Voith types for slow running machines have been designed. These are shown in Figs. 2 and 3, and they depart from the old method of introducing the stock from a point considerably above the top of the breast rolls.

Before discussing any specific inlet at this time, however, let us consider the mechanism of sheet formation as a whole, and follow the stock as it runs towards the presses.

First of all, the stock runs under the lip of the inlet into the wire. The lips are adjustable across the face, a fact which in itself counteracts the very purpose for which they are designed. It is obvious that a slice opening, which may vary as much as 20 per cent across the machine can not possibly give uniform liquid flow across the sheet. The necessity of running with wide variation of lip opening is frequently due to faulty design of the

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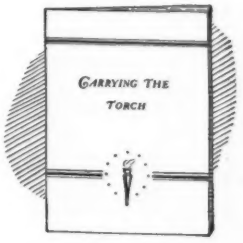

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head box and the head box approach and should be remedied at this point. If, however, in spite of changes which are made in the head box, the sheet continues to run light in parts, this condition should be taken care of by diverting the flow before it enters the lip, thus minimizing the possibility of disturbing cross currents after the sheet enters the wire. In Fig. 4, one way of doing this has been indicated. A gate adjustment has been installed right back of the parallel rack, and this adjustment, which may span over two or three of the partitions in the rack may be used to diminish the flow wherever the sheet shows heavy.

Of course, an uneven sheet is not necessarily due to an improper stock inlet. A streaky, spotty or worn wire will have the same effect, and the sheet will run light wherever the drainage is impaired. The machine tender may try to remedy this condition by opening up the stock inlet wherever there is a light spot, with the result that the stock mixture will run in excess at this point which in turn will cause cross currents toward the parts of better drainage, and thus distort the whole sheet formation. This fact is mentioned because it often happens that a remedy for this wire condition is attempted through adjustments in the stock, slice or head box. When the wire is not performing properly it should be cleaned by a souring process as these other correctives produce their own brood of troubles, and their quota of defective paper.

The next important parts on the paper machine in the process of sheet formation are the table rolls, and a short discussion of their influence on the sheet is in order.

The action of a table roll is two-fold. First, it creates a pressure under the partly formed sheet, and immediately thereafter a suction. This induces a pulsating action comparable to breathing against the bottom of the sheet. This may be explained as follows:

Some water is always following the surface of the table roll, which, together with the water clinging to the lower surface of the wire, will exert a pressure upwards at the nip where the roll meets the wire. The effect is a stretching upwards of the sheet at this point, then having passed the apex of the path of rotation the fibers are drawn down by suction created by the table roll. W. B. Campbell[3] determined this vacuum to be equivalent to a suction head

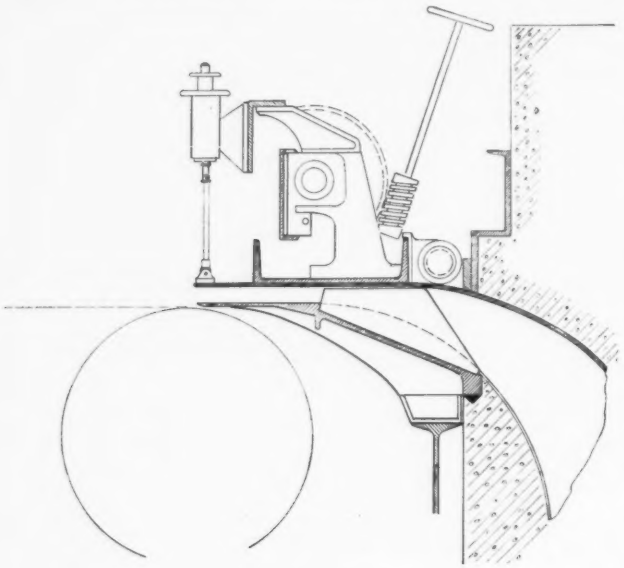

FIG. 2

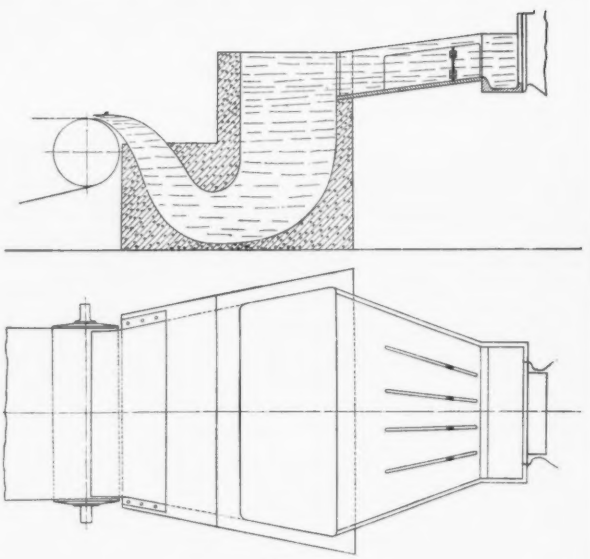

FIG. 3

of 20 cm. of water on a news machine traveling at 1200 f.p.m. In other words, the table rolls give the sheet a vertical shaking effect which is a most effective way of matting the sheet toegther.

The consistency of the stock on the wire is of importance in this connection. If the sheet is not sufficiently wet the forming and consolidation of the fiber is impaired, and the sheet will at intervals have obvious marks or welches. It is, therefore, important to keep the stock fluid until it reaches the suction boxes.

At the same time, the paper maker must remember that too much water on the wire causes spouting at the tube rolls which distorts the formation badly and gives a poor sheet.

Uneven or lopsided tube rolls will all have a detrimental effect on the sheet formation as the points of contact will be disturbed. This will result in uneven pressure and vacuum conditions across the sheet which in turn is followed by a streaky or uneven sheet formation.

After having reviewed generally the equipment available for forming the sheet, I want to elaborate somewhat on slow running, old fashioned machines, of which many are still in use and presenting many problems to papermakers.

I will try to show how the formation characteristics of these machines may be traced back to their specific mechanical peculiarities.

There is a distinctly different method of forming the sheet on these machines than is the case with machines having high pressure inlets.

The dimensions of the last partition of the head box, the distance from this partition to the slice, the position of the apron, the length of the wire and the number of table rolls thereon, the slant of the wire, are usually beyond the papermaker's control in his effort to make a well formed sheet.

In a functional analysis of the paper machine, let us for a moment eliminate the slice and see what happens. As the stock emerges from the last partition in the head box, it will rise to a certain level and immediately start running down the apronboard at increasing velocity. Before hitting the point where the slice is inserted, the velocity of the stock mixture may be greater than the speed of the wire. The narrower the last partition and the longer

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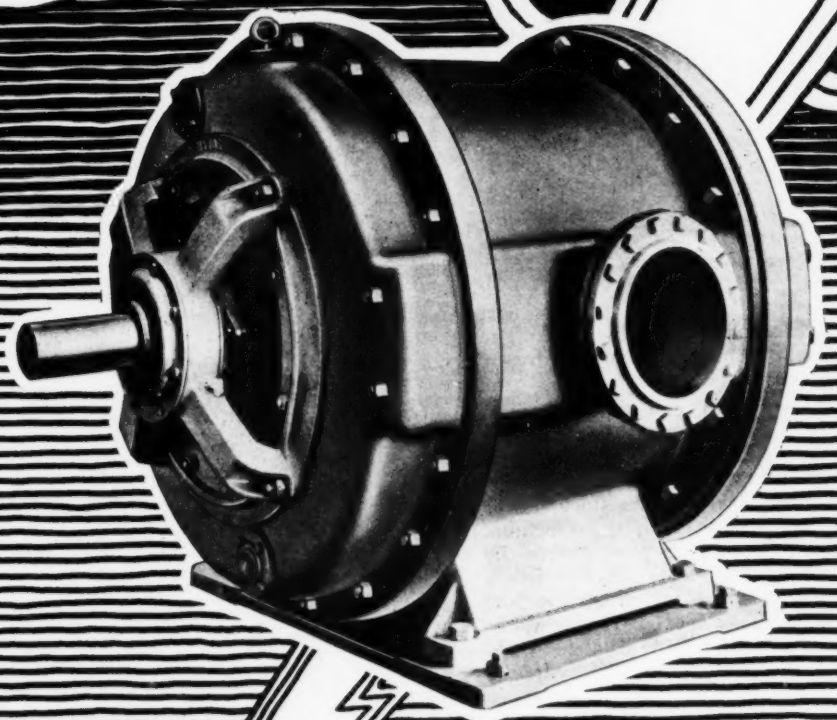

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the apronboard or the distance to the slice, the higher the velocity will be at this point. Let us then lower the slice down and we will see that it starts skimming off the top of the stock mixture and forms an eddy current which acts as a brake on the stock mixture. I believe this was the first action intended when the slice was invented. It was not invented for the purpose of controlling discharge velocity, but to retard the velocity of the stock mixture by its frictional action. If one slice was not sufficient, another was put in a few inches further down the wire to prevent cascading. The rolling action which can be seen on the top of the stock mixture between the slices is a clear indication of its retarding action, as indicated in Fig. 4.

Let us then consider the mechanics of sheet forming on a paper machine equipped with a straight slice. These machines may be equipped with one, or, as is the general rule, with two slices. Although the appearance of the sheet may be decidedly different if two slices are used, the principle of the process of sheet forming is the same in either case.

In the case of one slice, the apron is usually carried down the wire to within 1 inch or less of the slice. Up to this point, no drainage has taken place, but as soon as the stock leaves the apron a great rush of water will flow through the wire due to the pressure of the stock mixture resting on the wire. A mat is immediately formed on the wire, the chief characteristic of which is that the fibers are drawn out distinctly in the machine direction because the velocity of the stock is much slower than that of the wire. This we will call the first phase of the formation.

The next phase occurs after the balance of the stock leaves the slice and enters the wire on top of the already formed mat. Because the potential energy of the stock is here rapidly converted into kinetic energy, this part of the stock has a velocity closer to that of the wire. The shake is effective in rearranging some of the fibers already matted during the first phase of the process.

For greater clarity in presenting the essential mechanism of forming the sheet we will describe again what is taking place. The pool of stock traveling over the apron at slow speed and maximum head strikes the wire. Immediately, under the impetus of the head part of the stock drains quickly through the wire leaving a mat of fibers behind. In the next instant the balance of the pool strikes the slice where a combination of head and orifice create a hydraulic head which is transferred into a stream line flow according to the principles developed by the writer in a previous paper. The formation of the balance of the sheet is, therefore, governed by the principles of hydraulic flow.

The introduction of the second slice modifies the action considerably. The principal effect being to emphasize and prolong the effectiveness of static pressure head in forming the sheet and to decrease the significance of kinetic flow of the stock and the dependence of formation on the principles of hydraulic flow.

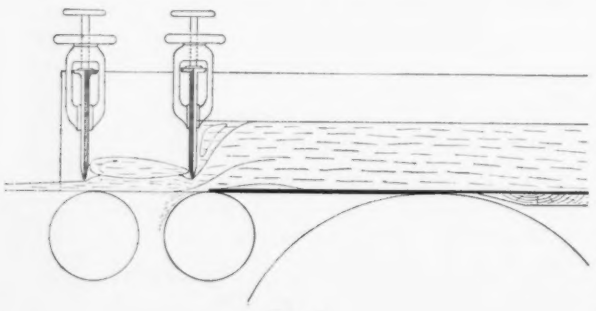

FIG. 4

In installing a second slice, attention must be given to the distance between it and the first slice as this is an important factor in the formation of the sheet. This distance will predetermine the minimum head which can be carried on the stock at this point. The smaller the distance, the lower is the head which can be maintained, which in turn will result in a higher velocity of the stock mixture between the slices.

The essential rôle of potential energy of pressure in forming the sheet for two slices is the same as when one slice is used, only that the first phase, or the formation of a mat, is emphasized when two slices are used. The bottom layer of the sheet is formed so firmly under pressure between the slices that an ordinary shake fails to have much effect on the rearrangement of the fibers. The resulting sheet is two-sided with distinctly different surface properties on opposite side of the sheet.

Thus we may explain the difference in sheet formation using straight slices instead of a high pressure inlet as one in which part of the sheet is formed under a static pressure at a stock velocity quite different from that of the wire and another part which is formed in the same manner as the stock from the high pressure inlet, viz., at a velocity comparable to that of the wire.

The advantages of a two phase sheet formation may be summarized as follows:

The sheet built up in the first phase is tight enough to slow up the drainage, so as to enable us to run the wire with no more water than is necessary to keep the fibers afloat till the sheet is finally set at the suction box. This thickened stock mixture will, furthermore, prevent the occurrence of disturbing cross-currents on the wire, and unevenness in velocities, which may result from the conditions previously discussed.

On occasions, the machine is run constantly at a slower speed than the speed of the stock mixture at the slice, with the result that the stock mixture tends to run ahead of the wire forming a lumpy or wavy sheet. One remedy for this is to raise the table rolls on the first 1/3 of the wire so as to form a curve. This will enable the papermaker to carry sufficient water without causing cascade effects and it also makes possible the formation of a heavier sheet without using two slices.

The disadvantage of the straight slice lies in the fact that the hydraulic conditions of the first phases of the formation are such that a homogeneous sheet cannot be formed. If this disadvantage can be eliminated, I consider the straight slice principle to be superior to the high pressure inlet. This is especially apparent for a long fibered stock, which is difficult indeed to form with a high pressure inlet. In this case we often remedy the absence of a bottom layer of stock which cuts the drainage, by adding small amounts of fine fibers such as ground wood or soda pulp as these fill the wire quickly and produce the slow drainage condition in the first section of the wire which produces such good results with the double slice.

I will again call your attention to the Voith inlet for slow running machines. A straight board, back of the inlet-nozzle where the velocity is still very low, is inserted, for the purpose of evening out the surface currents. This enables the operator to keep a low head in front of the inlet nozzle. Furthermore, the perforated roll at the entrance of the inlet nozzle offers a resistance against the flow at the same time that it acts as a current-breaker. It is also worth noticing the position of the discharge point.

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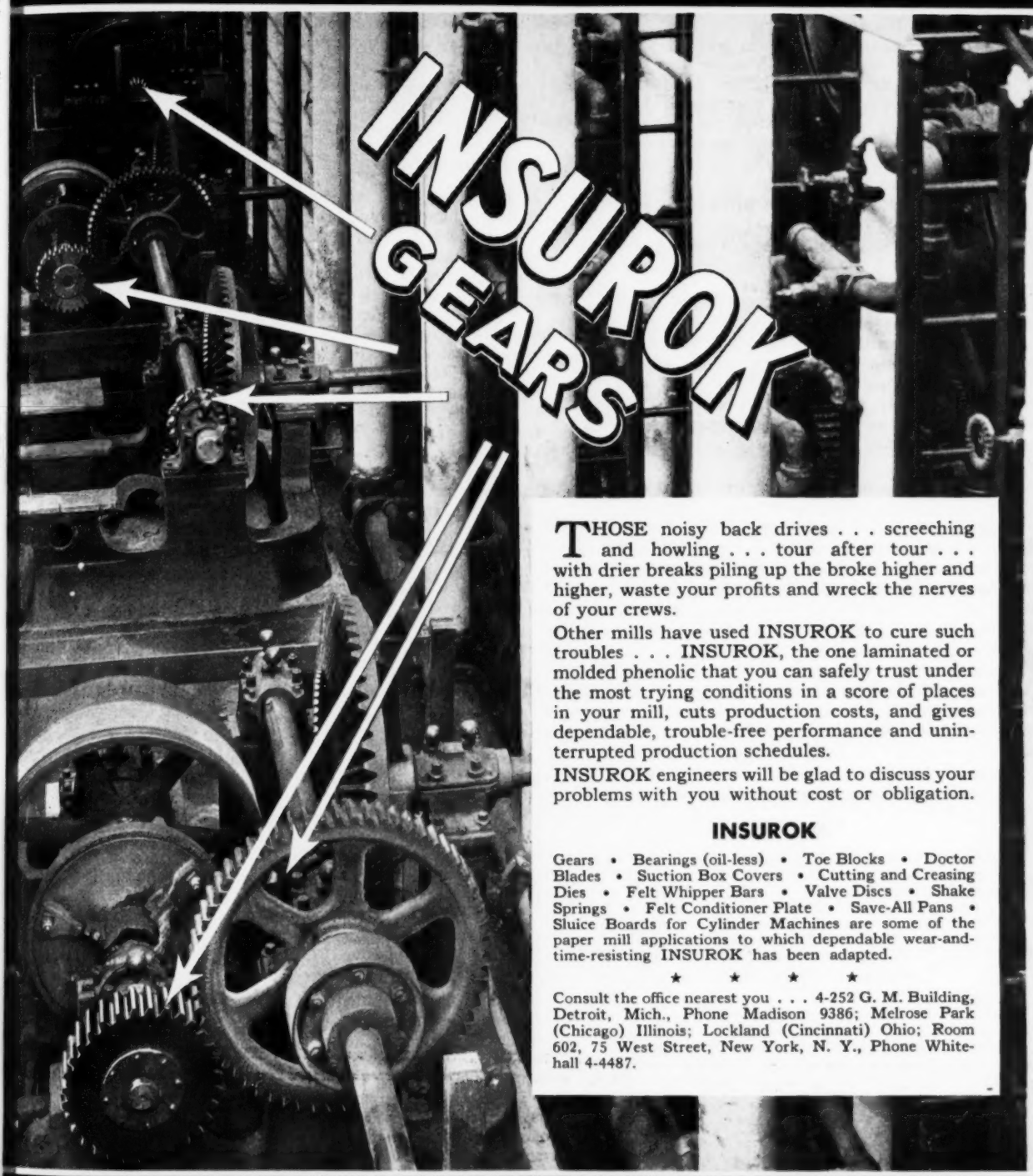

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This is drawn back a couple of inches behind the top of the breastroll, where actually no drainage is taking place. As the stock mixtures flows out on the wire at this point, the relative speed between the wire and the stock mixture has the tendency to straighten out the fibers which come in contact with the wire, to the effect that as soon as the drainage commences, a great number of fibers have already been arranged in the machine direction, and thereby the slice will somewhat imitate the forming action which characterizes the straight slice.

It is our object, regardless of what type of paper is made, ultimately to design the machine so that the hydraulic conditions at the inlet will permit the formation of a sheet with a uniform fibrous structure. The specific characteristic required of the sheet, the closeness of formation, the ratio of the cross and machine strength, will be deciding factors in determining the relative speed between wire and stock mixture.

As a means of improving these essential hydraulic conditions, I present for your inspection and criticism the thought of using a suction breastroll with an inlet as shown in Fig. 5.

The purpose of this arrangement is to form as large a portion of the sheet as possible before it travels out on the horizontal part of the wire, and under such hydraulic conditions as will permit the sheet to be formed without drawing out the fibers of the bottom layers unnecessarily sufficient water is left in the stock only to carry the sheet safely to the suction-boxes, a feature which would eliminate some of the biggest problems which confront the papermaker on the present fourdrinier machine.

The suction or the static pressure of the atmosphere will allow the largest portion of the sheet to be formed in a manner which I consider most advantageous, and by which, the relative speed between the wire and the stock mixture may be varied over a considerable range without the same danger of rolling up as we find on the present fourdrinier machine, where the fibers are sent out on the wire and bounce around loosely, subjected to any number of disturbing conditions.

Besides the forming possibilities the arrangement presents the following advantages: The possibility, by using one or more nozzles, of forming a sheet consisting of different grades of stock at the breastroll, and thereby getting a positive bonding between the laminations.

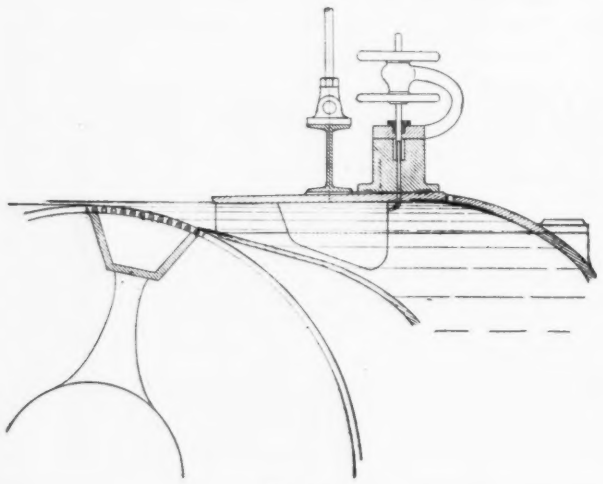

FIG. 5

The elimination of table rolls at higher speeds, at a point where considerable water is floating on the wire.

The possibility of shortening the whole fourdrinier part, and thereby the wire, in almost every instance.

The possibility of keeping approximately the same forming conditions at different speeds by control of the vacuum.

The fiber concentration can be kept considerably lower than on the present fourdrinier machine without the ill effect of flooding the wire with water, which invariably is detrimental to sheet formation.

Literature Cited

(1) Lund, A. M., Paper Trade J. 99, No. 6: 37-40 (Aug. 9, 1934).
(2) Bearce, G. D., Tech. Assoc. Papers 18: 311 (1935).
(3) Campbell, W. B. (Forest Prod. Lab., Canada) Quarterly Review (Oct. 1933).

Japan Waterproofs Paper Raincoats

Raincoats made of paper which has been impregnated with tung oil and designed for sale by baseball games, golf-courses, racetracks, and at other outdoor events are now being manufactured in Japan, according to a report from Tokyo, made public by the Commerce Department's Chemical Division.

These coats are made to retail at about 25 cents each and can be folded into small packets without developing cracks, the report states.

While the coats give off a tung oil odor, it is said to be less offensive than that of oils formerly used for the purpose.

Several patents have been granted in Japan covering the process.

Tung, or Chinawood oil, has been employed for centuries throughout the Orient as waterproofing for paper, silk and other fabrics, from which a wide variety of articles such as sunshades, umbrellas, decorative lanterns, waterproof bags and other items are made, and from all indications its use for similar purposes is growing in the United States.

With the exception of relatively small quantities of oil now being produced in Gulf Coast states where a domestic tung industry is being developed, the entire tung oil supply of the United States originates in China.

New Brunswick Exports 206,264 Cords

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., June 29, 1936—The annual report of the Department of Crown Lands in New Brunswick shows that a total of 206,264 cords of unmanufactured pulpwood, cut mainly from private lands, were exported from New Brunswick to the United States last year according to a report to the Department of Commerce from Vice Consul F. C. Johnson at Fredericton, N. B. Of this amount 96,000 cords were shipped by water and the remainder by rail. In addition to this amount 537,000 cords were consumed in New Brunswick mills, representing largely the 1934 cut.

Japan Produces More Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 1, 1936.—Production of foreign-style paper in Japan by the 11 members of the Japan Paper Manufacturers' Association during the first three months of the current year totaled 215,571 tons, registering an increase of more than 5 per cent over production during the corresponding period in 1935. Sales during the first quarter were even better amounting to 216,301 tons, an increase of 7½ per cent over last year. Increases occurred chiefly in the output of newsprint and other printing papers, writing paper, packing papers and boards.

FREE FLOWING

Bewoid needs no preheating. Just pour it from the drum into your Beater.

Bewoid is economical. Rosin consumption has been cut 25%; Alum 50%.

Bewoid will reduce foam and insure faster running with fewer breaks.

Wires and felts will last longer.

Sizing at a higher pH with Bewoid will produce finer quality paper with a better finish.

You can choose between making Bewoid in your own mill or purchasing from us in any quantity in drums.

BULKLEY DUNTON & CO.

295 MADISON AVE., NEW YORK, N. Y.

Selling Agents for

AMERICAN BEWOID COMPANY

BEWOID

ROSIN SIZE

Waste Sulphite Liquor*

By Guy Howard[1]

This paper is in the nature of a progress report on the developments at Marathon Paper Mills Company in processing waste sulphite liquor—in so far as it relates to stream pollution.

The new plant built for handling all the Marathon liquors is not yet in full operation and a report at this time is somewhat premature in that we cannot give results based on regular operations over an extended period. A considerable interest has, however, been manifested in its outcome by reason of its relation to stream pollution and our purpose in presenting a paper at this meeting is to afford the industry information as to its present status.

The subject wil be discussed under the following headings: Description of Process, Products and Process Credits, Operating Expense and Investment, Cooking Acid from Recovered Products, Fuel Product, Relation to Stream Pollution, Scope of Process.

Description of Process:

Lantern slide No. 1 illustrates a flow sheet of process. The concentrated and dilute drainage from blowpits is pumped to an inclined screen for recovery of fiber which is returned to the blowpit and the liquor goes to two raw liquor storage tanks having a capacity of 110,000 gallons.

From 3,500 to 4,000 gallons of liquor per ton of pulp production are processed and this amount will carry 90-95 per cent of the organic matter dissolved in the digesters. The temperature of liquor processed is around 70 deg. C. and its specific gravity about 1.035.

Caustic lime is required as the processing reagent. Burnt lime in bulk carload shipments is unloaded into a lime storage bin from which it feeds through a constant weight feeder to a rotary slaker from which it passes through a classifier to remove grit and thence to a milk-of-lime storage tank. Lime for both this process and for the bleach plant is prepared in this equipment at a strength of about 1 lb. CaO per gallon.

Liquor from raw liquor storage tanks is pumped to the first or 10P reaction tank, at a normal feed rate of 300 g.p.m. Enroute it passes through a mixing chamber in which the "secondary reagent" (described later) is added to the raw liquor and some milk-of-lime (termed "primary reagent") is added to the liquor in this first reaction tank. The amount of reagent added at this step is controlled to give a desired flocculated precipitate in the liquor leaving the reaction tank. This condition is reached at around pH = 10.5.

The discharge from this reaction tank goes to a settling tank of the Dorr type. The underflow from this settling operation is withdrawn as a slurry containing sulphur and lime products for use in making cooking acid and the clear liquid overflow goes to a feed tank for the second or OP reaction tank.

Milk-of-lime ("primary reagent") is added to the liquor pumped into this second reaction tank. The amount of reagent is regulated in relation to the liquor flow to precipitate the desired amount of organic matter in this step. It comes out as a flocculated organic precipitate and the liquor leaving this reaction tank is somewhat higher than pH 11.0 and flows to the second settling tank.

The underflow from this settling operation is pumped to a vacuum filter of the Oliver type to recover the filter cake which constitutes the fuel product and the filtrate returns to the process. The clear liquor overflow goes to the feed tank for the third or SR reaction tank.

Milk-of-lime is added to the liquor pumped into this third reaction tank. The purpose of this step is to give the liquor its final stripping and to provide the so-called "secondary reagent" for use in the first reaction step of the process. The amount of reagent added is regulated in relation to the liquor flow and to provide an excess over the reaction requirements of the liquor sufficient to supply most of the reagent requirements of the first reaction tank. The pH of liquor discharging this reaction tank is slightly higher than from the second reaction tank and flows to the third or SR settling tank.

The underflow from this settling operation is pumped as a slurry to a tank and constitutes the so-called "secondary reagent" used in the first reaction tank. It is a mixture of precipitated organic matter and available caustic lime reagent. The clear liquor overflow constituting the process effluent (CHF) is passed through a heat exchanger to recovery heat in the form of hot water for use in the bleach plant and for slaking the lime reagent and the cooled effluent is then discharged to a sewer.

Products and Process Credits:

The recovered products and credit items of the process are (1) sulphur and lime for making cooking acid, (2) organic matter for use as boiler fuel, (3) pulp now lost in blowpit drainage, (4) heat from process effluent recovered as hot water for mill uses, (5) reduced steam consumption in acid plant during winter, (6) less upkeep expense on acid towers, (7) easier controlled and more uniform cooking acid, (8) probably some economies due to improved pulping action of cooking acid made from the recovered products, and (9) an improved effluent as regards stream pollution.

While these credit items have yet to be fully proven by regular operation over an extended period, the plant operation to date gives considerable assurance that all or most of them can be realized and our expectations on some of the items are as follows.

The sulphur recovered is in the form of calcium mono-sulphite and will range in amount from 50 to 75 lbs. of sulphur per ton of pulp production for liquors from different mills. In principle it is the sulphur equivalent of the free SO_2 and residual bisulphite plus the loosely combined sulphur in the liquors.

The minimum amount of lime recovered is that present in the recovered calcium mono-sulphite and this will range from 88 lbs. of CaO per ton of pulp production for a sulphur recovery of 50 lbs. to 131 lbs. of CaO for a recovery of 75 lbs. of sulphur. The process affords additional sources of lime for making cooking acid and, if desired, sufficient lime can be recovered to supply all the base requirements of the cooking acid.

The recovered fuel product will amount to around 1,250 lbs. dry weight per ton of pulp from Hemlock liquors and somewhat less for Spruce liquors. It has a calorific value around 8,500 B.t.u. per lb. dry weight with 18 per cent ash by ignition.

The other credit items are more dependent on local conditions and need not be discussed here.

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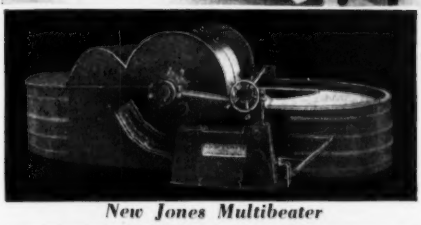
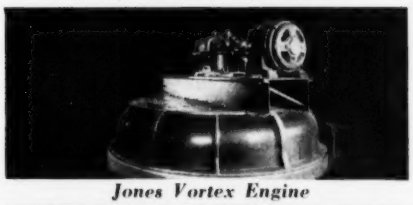
* Paper presented at Meeting of American Pulp & Paper Mill Superintendents' Association in Grand Rapids, Michigan on June 25, 1936.

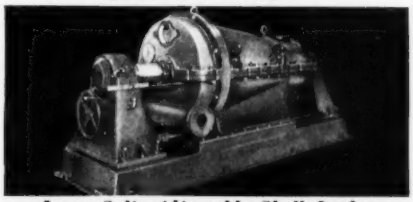
[1] Marathon Paper Mills Co., Rothschild, Wis.



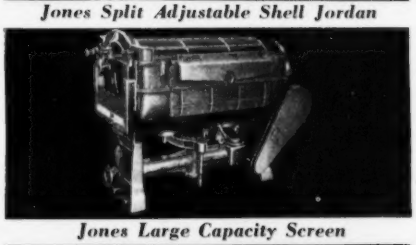
New Jones Multibeater



Jones Vortex Engine



Jones Split Adjustable Shell Jordan



Jones Large Capacity Screen

Improved Jones Pulper

And Jones' equipment performs each operation in stock preparation with thoroughness and low power consumption.

You are invited to judge Jones' Pulpers, Beaters, Jordans, Screens and other products, as separate units. Check each as to resulting quality of finished paper, speed, and operation and power costs. Then you will appreciate why so many prominent mills in the United States and Canada are Jones equipped.

Are you interested in new equipment? Let Jones submit a proposition for a balanced installation. Do you wish to modernize your present set-up to reduce production costs and improve product? Jones likewise is ready with pertinent suggestions. In any event, send for the latest literature. Write today.

E. D. JONES & SONS COMPANY

PITTSFIELD, MASS.

Jones

BEATERS · JORDANS
SCREENS · PULPERS

Operating Expense and Investment:

The main expense items are lime reagent, labor, power, supplies and maintenance, supervision and capital charges.

The lime reagent cost is by far the largest item. Either burnt or hydrated lime is required and the amount will range from a minimum of 275 lbs. of CaO per ton of pulp production to a maximum of 350 lbs. as determined by liquors from different mills. It is to some extent directly proportional to the amount of recoverable sulphur in the liquors but is also influenced by other factors.

Labor requirements should not be over one operator and two helpers per shift, including operation of the lime-slaking plant. Power will range from 1 to 1.5 h.p. per ton of pulp. Supplies and maintenance should not be excessive and supervision can be handled by the pulp mill staff.

Investment will range from $1,000 to $1,500 per ton of pulp production depending on size of plant, local conditions and details of design and construction.

The economics of the process are determined largely by the pulp mill costs for sulphur, lime-rock, burnt lime and fuel. Under Marathon conditions some net profit is expected from its operation.

Cooking Acid from Recovered Products:

Pulp of standard high quality is now being made regularly with cooking acid containing the recovered calcium mono-sulphite product and without change in the digester operations.

The cooking acid is being made in a tower system by adding a slurry of the calcium sulphite products to the weak acid from a rock-filled tower as it goes to a strong gas tower in which the rock was removed and replaced with a wood filler section to function as a gas absorption unit. The slurry dissolves readily and one pass through this tower is found sufficient. The amount of slurry added is regulated to give the desired combined in the acid and this is pumped direct to the acid storage tanks.

The requirements for making a complete cooking acid from the slurry alone are to dilute with the proper amount of water and treat with SO_2 gas from a sulphur burner.

Fuel Product:

The fuel product now coming off the filter contains around 67 per cent moisture. We expected to get it somewhat lower than this but have not yet accomplished it and finding the best method of handling the fuel product to yield its maximum fuel value has been a major problem. Various choices in the matter are being investigated and when a decision is reached the necessary equipment will be installed.

Meanwhile, about one-third of the full fuel production of the process can be dried in existing equipment to around 50 per cent moisture and this is being burned with coal in the boiler plant. The process is now being operated on a 24-hour basis for the production of the cooking acid products and on part time as regards production of the fuel product.

Relation to Stream Pollution:

A final decision on the beneficial effects as regards stream pollution of thus processing waste sulphite liquor can only be gotten by a comparison of stream conditions before and after such treatment. Arrangements have been made to get the data necessary for this comparison on the Wisconsin River at the Marathon Mill.

Meanwhile, tests on the process effluent in comparison with the untreated liquors show a reduction of at least 80 per cent in biological oxygen demand (B.O.D.). This evidently results, (1) from the removal of lignin substance which is probably the major cause of oxygen demand and the source of whatever toxic effects the untreated liquor may have, (2) from alterations in the sugar constituents taking place under the hot alkaline conditions of the process, (3) from the treatment having satisfied the lime demand of the raw liquor, and (4) from the effluent being alkaline rather than acid.

The process removes nearly 50 per cent of the organic matter in the raw liquor and the organic matter removed is largely lignin substance. This, together with the resultant reduction in oxygen demand, should be sufficient to avoid stream pollution under most mill conditions.

If, in special cases, it is necessary to further purify the effluent this can be accomplished either by subjecting the liquor to fermentation or bacterial action on the sugar constituents before the precipitation process, or by giving the process effluent a short pressure cooking treatment which precipitates additional organic matter.

Scope of Process:

This precipitation process was designed primarily for liquors resulting from a calcium-base cooking acid but it is equally applicable for treatment of liquors from ammonia-base acid.

With Dolomitic-base cooking acid it requires somewhat more lime reagent and modifications to handle the larger sludge volumes and to balance the recovered lime and magnesia with the base requirements of the cooking acid.

The process is not applicable to liquors from Sodium-base cooking acids.

John Benge Sr. Dead

After a serious illness and an operation John Benge, Sr., of Yorklyn, Del., died at the St. Francis Hospital June 17. He was born January 22, 1864 at Newark, Del. At the age of twelve he began work with the Chester Paper Mills on Buck Run Creek near Modena. After nine years' experience in paper making he went to work for the Valley Forge Mills at Valley Forge, Pa., and then for the Slack Water Mills on the Connestoga Creek near Lancaster, Pa. In 1887 he gave up paper making and moved to Northbrook, Chester County, where he contracted to cut willow wood for the Dupon Company.

In 1882 he married Fanny Hess, who lived near Lancaster.

In the fall of 1888 he began work for Israel W. and T. Ellwood Marshall at their paper mill at Marshall's Bridge south of Kennett Square. For a time, then, he went to work for an uncle at Wooddale, Del., for the Marshall & Mitchell Company, but when the Marshall Brothers' Mill at Yorklyn was started in 1892, he took charge of the mill and moved to Yorklyn.

About three years ago he was retired from active duties and continued to be consulted regarding paper-making problems at Marshall Brothers and at the National Vulcanized Fibre Company Mills at Yorklyn.

He is survived by his wife, Mrs. Fanny Benge, and by two sons, Frank H. Benge and Leroy Benge, and by a daughter, Mrs. Herbert Guest. Also by three brothers, Carlton Benge and Barden Benge of Modena, Pa., and Thomas Benge of Hockessin, Del.; also by his sisters Mrs. Colwell Gibbons of Wilmington, Mrs. Kate Burns of Chester and Mrs. Preston Darlington of Pottstown.

He was a member of Friendship Lodge No. 22 and Rural Encampment No. 17 I.O.O.F. of Hockessin, Hockessin Castle No. 15 K.G.E., Kenneth Lodge No. 475 F. & A. M., American Pulp and Paper and Superior Industry Association and the National Association of Stationary Engineers.

The funeral will be held at two P. M. Saturday afternoon from his home in Yorklyn.

Canadian I.P.C. Reduces Loss

Richard J. Cullen, president, in submitting to the stockholders of the Canadian International Paper Company the statement of consolidated profit and loss and deficit for the year 1935 and the consolidated balance sheet at December 31, 1935 says:—

"During 1935 the newsprint mills of the company and its subsidiaries operated at about 84 per cent of their rated capacity. Production for the year totaled 672,738 tons as compared to 659,566 tons in 1934. The Kipawa and Hawkesbury sulphite pulp mills again operated substantially at capacity with production of 150,969 tons as compared to 146,027 tons in 1934.

"Reflecting the increase in physical volume of business consolidated gross sales amounted to $38,538,395, an increase of 7 per cent over the previous year. After all charges including interest on junior bonds (all owned by International Paper Company), depreciation, depletion, etc., there was a net loss of $3,759,427 for the year as compared to $3,984,823 in 1934.

"On January 25, 1936 a burst penstock flooded the hydro-electric plant of the company's Newfoundland subsidiary with serious damage to the generating equipment. The cost of repairs is estimated at $350,000. Limited operation had been resumed on February 1, 1936 and by February 6 sufficient power was available to operate the paper mill at about 70 per cent of rated capacity. By May 20, 1936 repairs had been practically completed.

"Effective January 1, 1936 the price of newsprint delivered at New York and Chicago was established at $41 a ton, an increase of $1 a ton."

CANADIAN INTERNATIONAL PAPER COMPANY
AND SUBSIDIARY COMPANIES
Consolidated Statement of Profit and Loss and Deficit
For Year Ended December 31, 1935

SALES AND OTHER INCOME		
Gross sales, less returns, allowances, discounts		$38,538,394.79
Other income—net (see summary)		167,456.59
		$38,705,851.38
COST AND EXPENSES		
Cost of sales:		
Pulpwood, labor, materials, etc.	$22,052,083.03	
Maintenance and repairs	2,181,871.13	
Taxes (other than income taxes)	522,103.53	
Outward freight and delivery expenses	6,259,895.05	
Selling, general and administration expenses	2,365,638.16	
Provision for doubtful accounts	7,357.25	33,388,948.15
		$5,316,903.23
Deductions: Interest on obligations of subsidiary companies	$2,039,896.76	
Interest of Canadian International Paper Company:		
On first mortgage bonds and prior liens	1,385,800.32	
On other obligations	2,003,304.36	
Amortization of debt discount and expense	373,133.30	
Depreciation	2,178,359.89	
Depletion	584,787.22	
Profits tax of subsidiary companies	6,648.48	
Undeclared cumulative dividends for 1935 on 5% preference shares of International Power and Paper Company of Newfoundland, Limited (£104,000 at $4.85)	504,400.00	9,076,330.33
NET LOSS FOR YEAR		*$3,759,427.10*
PROFIT ON BONDS AND DEBENTURES REDEEMED DURING 1935		159,031.66
		$3,600,395.44
DEFICIT—January 1, 1935		*10,191,364.05*
TRANSFERS FROM RESERVES—Profits arising prior to 1931 from sales of properties and securities to affiliated companies and others (see Schedule E)		5,325,809.14
DEFICIT—December 31, 1935		*$8,465,950.35*

Summary of Other Income—Year Ended December 31, 1935

Interest income		$59,997.36
Dividend income		630.00
Discount on purchases		36,908.30
Profit on exchange		167,502.24
Rentals—miscellaneous properties		11,419.89
Insurance claim—net		71,265.45
Miscellaneous—net		12,688.43
		$360,411.67
Less: Loss on sale of shares of Newsprint Bond and Share Company, less reserve previously provided	$26,243.00	
Unrealized profit on newsprint and pulp sold to affiliated companies and remaining in their inventories	166,712.08	192,955.08
TOTAL OTHER INCOME—NET		$167,456.59

Pacific Coast Mills Sign Union Agreement

[FROM OUR REGULAR CORRESPONDENT]

HUDSON FALLS, N. Y., June 27, 1936—John P. Burke, president of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, has returned from an extended business trip to Portland, Ore., where he held conferences with representatives of all the large pulp and paper companies in the Pacific Northwest. He reports that a blanket agreement was signed covering virtually all of the mills of these companies, the agreement being strictly union shop and carries with it a general increase in wages of five cents an hour for men and two cents for women. It is estimated that 6,000 members of the Pulp and Sulphite Workers Union are covered by the agreement and 4,000 members of the Papermakers Union. Wide publicity was given to the successful negotiations carried on between the manufacturers and unions. A leading publication in the Pacific Northwest carried a feature story dealing with employer-union relations in the paper industry and accompanied the article with a photograph of Mr. Burke, who was a leading figure in the negotiations. Mr. Burke made the trip by airplane and returned by the same route.

Right Angle Speed Reducers

The Falk Corporation, Milwaukee, Wis., has just issued Bulletin No. 2100 with 60 pages describing in detail its right angle speed reducers—both horizontal and vertical types. The units in this bulletin are all rated according to the "Recommended Practice" of the American Gear Manufacturers Association. Complete directions for selecting a standard unit to meet the majority of power transmission applications are included in this bulletin together with specifications and dimensions. The units described cover a ratio range from 1.5:1 to 518:1 and ratings of 1 to 1200 horsepower at 100 r.p.m.

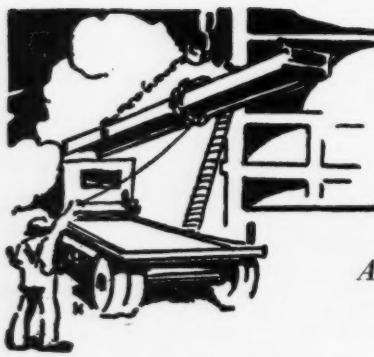
Herringbone Speed Reducers

The new 56 page bulletin describing in detail parallel shaft speed reducers (with both sleeve and roller bearings) rated according to the "Recommended Practice" of the American Gear Manufacturers Association, has just been announced. This bulletin issued by the Falk Corporation, Milwaukee, Wis., is complete in every detail, specifications, A.G.M.A. ratings, service factors and directions for selecting, dimensions and applications. Fifty-two different sizes in capacities from 1 to 1000 horsepower at 100 r.p.m., with 45 different standard ratios, are covered.

Bird & Son Announce Bonus

EAST WALPOLE, Mass., June 29, 1936—Reporting an increase of business in all departments for the first six months of 1936 over the same period in 1935, Bird & Son, Inc., have announced a semi-annual bonus distribution to their employees.

Employees who on June 30 had been in the continuous service of the corporation for over five years will receive 4 per cent of their normal months' earnings, and employees whose service has been over two years but less than five years will receive 2 per cent.



CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Maspeth, L. I.—The Star Corrugated Box Company, Inc., 55-15 Grand street, Maspeth, manufacturer of corrugated boxes and containers, has awarded general contract to J. K. Turton Company, Grand Central Terminal, New York, for new two-story plant addition, for which superstructure will be placed under way at early date. It will cost about $100,000, including equipment, providing for large increase in present capacity. L. Davidson, 55 West 42nd street, New York, is architect. Project will be carried out in name of the Starcor Realty Company, first noted address, an affiliated organization.

Glens Falls, N. Y.—The Imperial Paper and Color Corporation, Warren street, manufacturer of wall paper stocks has approved plans for new one-story steam power house at local mill, and will proceed with superstructure at once. General erection contract has been let to Howard Ramsey, 42 Notre Dame street, Glens Falls. It will cost close to $50,000, with equipment.

Everett, Wash.—The Soundview Pulp Company, manufacturer of bleached sulphite pulp, is having plans completed by Hardy S. Ferguson & Co., 200 Fifth avenue, New York, engineers, for proposed expansion at mill at Everett, recently referred to in these columns, and will proceed with superstructure at early date. Work will include several new brick, steel and concrete buildings, to be known as Unit No. 2 at the plant. Equipment will be installed to develop increase in capacity from 6000 tons to 9500 tons per month. Necessary water supply will be secured through the city, which is arranging plans for delivering 12,000,000 gallons per day at the mill through new pipe line and operating facilities. Entire project will cost about $2,000,000, and is scheduled for completion early in 1937. The company recently increased capacity at the plant from 5000 to 6000 tons, with an expenditure of about $500,000. Financing has been arranged for the new mill unit. L. S. Burdon is general manager at the plant.

Buffalo, N. Y.—Fire recently damaged a portion of plant of Great Lakes Paper Stock Company, 212 Ohio street. An official estimate of loss has not been announced. The damage will be replaced.

Trenton, N. J.—The Stacy Paper Box Company, Inc., 1514 Chestnut avenue, manufacturer of paper boxes and containers, has leased large building in the rear of 124 Division street, and will occupy for expansion, primarily for storage and distribution. Building will be improved and taken over at once.

Port St. Joe, Fla.—The St. Joe Paper Company, Inc., recently organized under direction of Almours Securities, Inc., Barnett National Bank Building, Jacksonville, Fla., is having plans drawn by George F. Hardy, 305 Broadway, New York, N. Y., engineer, for proposed new pulp and paper mill at Port St. Joe, where large tract of waterfront property was recently acquired, as noted in these columns. Plant will consist of a number of one and multi-story units, to be equipped for the production of kraft liner board and kindred products, with initial rating of 350 tons per day. In addition, the company proposes to establish a division for extensive experiments in newsprint production, using local timber for pulp wood service, and a newsprint machine and auxiliary equipment will be installed for this purpose. Company has begun the drilling of several wells for water supply and will install pumping plant for this service. A power house will also be constructed. In addition to large timber resources in Gulf, Franklin and other bay counties, recently secured by the Almours company for pulp wood supply, totaling about 150,000 acres in all, another tract of 48,000 acres of land has just been acquired in Liberty County and will be added to the holdings. Sawmills and other buildings will be constructed for this purpose, with the installation of mechanical-handling facilities for pulp wood for the mill. Construction of initial plant units is scheduled to begin at early date. The Mead Corporation, Chillicothe, Ohio, is interested in the project, and operation and management of the St. Joe company will be under such direction. George H. Mead, president of the Mead organization, and Sydney Ferguson, vice-president, will be chairman of the board and president, respectively, of the new company. Entire project will cost about $7,000,000, with equipment, and is scheduled for completion next spring. Financing has been carried out through the Almours Securities, Inc., noted.

Bloomfield, N. J.—The former mill of the Diamond Mills Paper Company, Hoover avenue, where operations were discontinued some time ago, has been acquired by the Townsend Lawn Mower Company, Bloomfield, which will occupy for its business in the future.

Chicago, Ill.—The Atlas Label and Carton Corporation has been organized with capital of 100 shares of stock, no par value, to take over and operate company of same name, with local plant at 450 West Superior street, manufacturer of paper containers and cartons of various kinds. The principal incorporators of new company are Robert L. and Isaac B. Bachman.

New Companies

Big Beaver, Mich.—The Fibre Products, Inc., 878 Farms Building, Big Beaver, has been organized with capital of 40,000 shares of stock, no par value, to manufacture and deal in fiber products and paper goods. Edwin N. Burrows, address noted, is principal incorporator and head.

Trenton, N. J.—The Trenton Container Company has been organized with capital of 1000 shares of stock, no par value, to manufacture and deal in paper containers, boxes, etc. New company is represented by Elmer E. Gaus, Trenton, attorney.

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FUTURE MEETINGS

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Summer International Meeting in Canada, August 3 to 7, Montreal, Quebec, The Saguenay. Details may be obtained from the secretary, R. G. Macdonald, 122 East 42nd street, New York.

GOVERNMENT INTERFERENCE WITH THE AMERICAN INDUSTRIAL SYSTEM

"Government interference with the American Industrial System" written by Allen W. Rucker, the well-known business economist, and N. W. Pickering, president of the Farrel-Birmingham Company, will, in view of the increasing governmental tendency to interfere more and more with business and the resultant uncertainty felt in many quarters, be considered an important contribution to current liberation. This thesis brings out clearly, from a study of American industry over a period of fifteen years, that neither higher wage rates, shorter hours nor rising industrial prices are the formulae for business recovery.

The authors show from official government data an entirely new relationship between industrial and farm prices. Their study reveals that governmental interference with factory wage rates creates a distortion between industrial and farm prices, and that the decline of factory output below normal is almost exactly proportional to price distortion existing throughout the period 1921-1923 and 1929-1935. In a series of conclusions sharply correcting New Deal economists who seek to fix industry with the responsibility for unemployment, the authors note that:

1. Industry has never failed, through improved machinery and methods, promptly to balance its costs and prices with the farm price level, until and unless interfered with by government—and that government interference is a major cause in both the intensity of depression and the slowness of recovery therefrom.

2. The most prosperous periods in American industry are those in which the prices of manufactured goods, relative to the farm price index, are being reduced—and the reduction in prices is accompanied by increased employment, purchasing power and consumption.

3. The periods of unemployment and under-consumption occur when the costs and prices of manufactured goods are rising relative to the farm price level—and the rise is accompanied by a decline in factory output, employment and purchasing power.

4. Further reduction now in the industrial price level is obstructed by excessively high wage rates relative to farm prices—and an additional increase in hourly wage rates threatens further price distortion and consequent decline in industrial and business activity.

In addition, the authors cite that factory unemployment is largely traceable to the failure of some 69,000 manufacturers who could not keep going in the face of governmental interference and they call upon government for relief from interference in business, freedom to restore flexible wage rates and working hours, and education of labor to seek higher annual incomes through greater productivity instead of through higher wage rates.

In the 1923-1929 period, industrial prices were not only declining in dollars, but, in addition, they were declining relative to the farm price index. That is a very important point, for in the 1929-1933 period industrial prices as a whole were declining only slightly in dollars and actually were rising relative to the farm price level. Put another way, the failure of most industrial prices to decline as rapidly as the farm price index, was to produce, in effect, a *rising scale* of industrial prices relative to farm prices. It was that rising tendency which was the chief factor in the tremendous shrinkage of the consumption of the products of some industries.

The tendency of many industrial prices to rise relative to farm prices in 1929-1933 is not, however, attributable to any shortcoming of the American system. It is attributable to the relative rise in hourly wage rates, which, at the behest of both the Hoover and Roosevelt administrations, were maintained at levels far above those warranted. The industrial price level follows wage rates and the artificial maintenance of those rates is responsible for the malfunctioning of the American system in 1929-1933.

It is to the lasting credit of industry that it has, in the past few years, been enabled, with improved equipment and methods, to offset in great part the effects of that condition.

The highly prosperous era of 1923-1929 was a period of relatively free functioning of the American system without interference by the Federal Government.

And, conversely, the period 1929-1933, and the subsequent period as well, were both marked by continual use of the influence of the Federal Government to interfere with the normal functioning of the American System in order to maintain excessively high wage rates.

This interference with the system and the consequent inability of management to reduce costs sufficiently to balance factory prices with farm prices accounts for declining consumption and unemployment.

It is emphasized that the way out is largely dependent upon a strong revival of the American industrial system, which, when allowed to function without Government interference, has never yet failed to meet any condition. And it is repeated that the basis upon which manufacturing in-

dustries can consolidate and extend their part of the recovery movement is:—

1. Relieve manufacturers of the handicap of Government interference and threat of Government control, in order that they may restore flexible wage rates and thereby balance production costs and industrial selling prices with the purchasing power of consumers, especially agricultural consumers;

2. Restore flexible working hours in order that each industry may, with its workers, develop maximum efficiency and low cost production and thereby increase the purchasing power of all consumers;

3. Encourage labor to seek higher income, not through raising wage rates but through greater productivity of low cost merchandise;

4. Stimulate confidence in industry, remembering that it is the successful and expanding enterprise which provides both employment and purchasing power and that the larger proportion of factory unemployed labor today was once on the payrolls of businesses which could not keep going in the face of Government interference.

Prince Rupert Mill Project Progressing

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., June 27, 1936.—F. L. Buckley, 1030 Hamilton street, Vancouver, B. C., representative of the company which plans to build a $5,000,000 250-ton bleached sulphite pulp mill at Prince Rupert, B. C., recently returned from the northern city and has now left for the East.

Mr. Buckley stated in Vancouver that he had completed a survey of the water log, etc., in the Prince Rupert area, and favorable progress is being made in the preliminary arrangements which must precede the actual construction work on the plant. While in the east Mr. Buckley will endeavor to complete the financial arrangements for the project, and thus clear the way for an early start. Already arrangements have been completed for disposal of the output of the plant, which will be shipped by water and rail to eastern Canadian and interior United States consumers.

It is expected that about eighteen months will be required for erection of the plant, which will be largely of steel and concrete construction. The Northern B. C. Power Company will supply power, which will be augmented to some extent by power which the pulp company can produce itself.

A permanent payroll estimated at 2000, including those employed in logging operations in the woods, is expected by principals of the company, who state that logging will be commenced well in advance of completion of the plant.

Supply of logs will be obtained from the 4½ billion feet of titled timber which the company controls on the Queen Charlotte Islands and the Skeena River.

To Represent P. H. Glatfelter in Chicago

Charles L. Streeter, with offices at 538 S. Clark street, Chicago, has been appointed sales representative for the P. H. Glatfelter Company in the Middle Western territory. Mr. Streeter was formerly with the Swigart Paper Company, Chicago, and has had a long experience in the sale of fine papers. He will contact merchants on the Glatfelter lines of book, bond and mimeograph papers and converters on envelope, tablet and specialty papers.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association:

COMPARATIVE MONTHLY SUMMARIES

Month	1936	1935	1934
January	76.1%	65.8%	.....
February	77.9%	70.0%	.....
March	76.0%	70.5%	.....
April	82.3%	70.0%	.....
May	81.7%	69.4%	.....
June	.....	72.3%	.....
July (b)	.....	67.8%	.....
August	.....	70.9%	.....
September (c)	.....	75.0%	59.4%
October	.....	75.6%	64.7%
November	.....	75.3%	61.7%
December (a)	.....	74.3%	62.1%
Year	.....	71.2%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1936		CORRESPONDING WEEKS, 1935	
*June 6	82.0%	June 8	70.5%
*June 13	81.3%	June 15	71.7%
*June 20	78.3%	June 22	73.3%

The following statistics show the number of mills reporting by ratio groups:

Ratio Limits	Number of Mills Reporting, Current Weeks: June 6, 1936	June 13, 1936	June 20, 1936
0% to 50%	77	87	60
51% to 100%	256	241	180
Total Mills Reporting	333	328	240

* Subject to revision until all reports are received.
These data exclude (a)—Christmas Day, (b)—Fourth of July, (c)—Labor Day.

PAPER BOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours," were as follows:

1934		1935		1935		1936	
Sept.	62%	Jan.	61%	July	59%	Jan.	61%
Oct.	63%	Feb.	67%	Aug.	65%	Feb.	67%
Nov.	56%	March	67%	Sept.	69%	March	68%
Dec. (a)	53%	April	61%	Oct.	76%	April	70%
		May	61%	Nov.	70%	May	68%
		June	65%	Dec.	60%		

Week ending June 6, 1936—65%
Week ending June 13, 1936—71%
Week ending June 20, 1936—71%

Sutherland Makes Paper Oil Cans

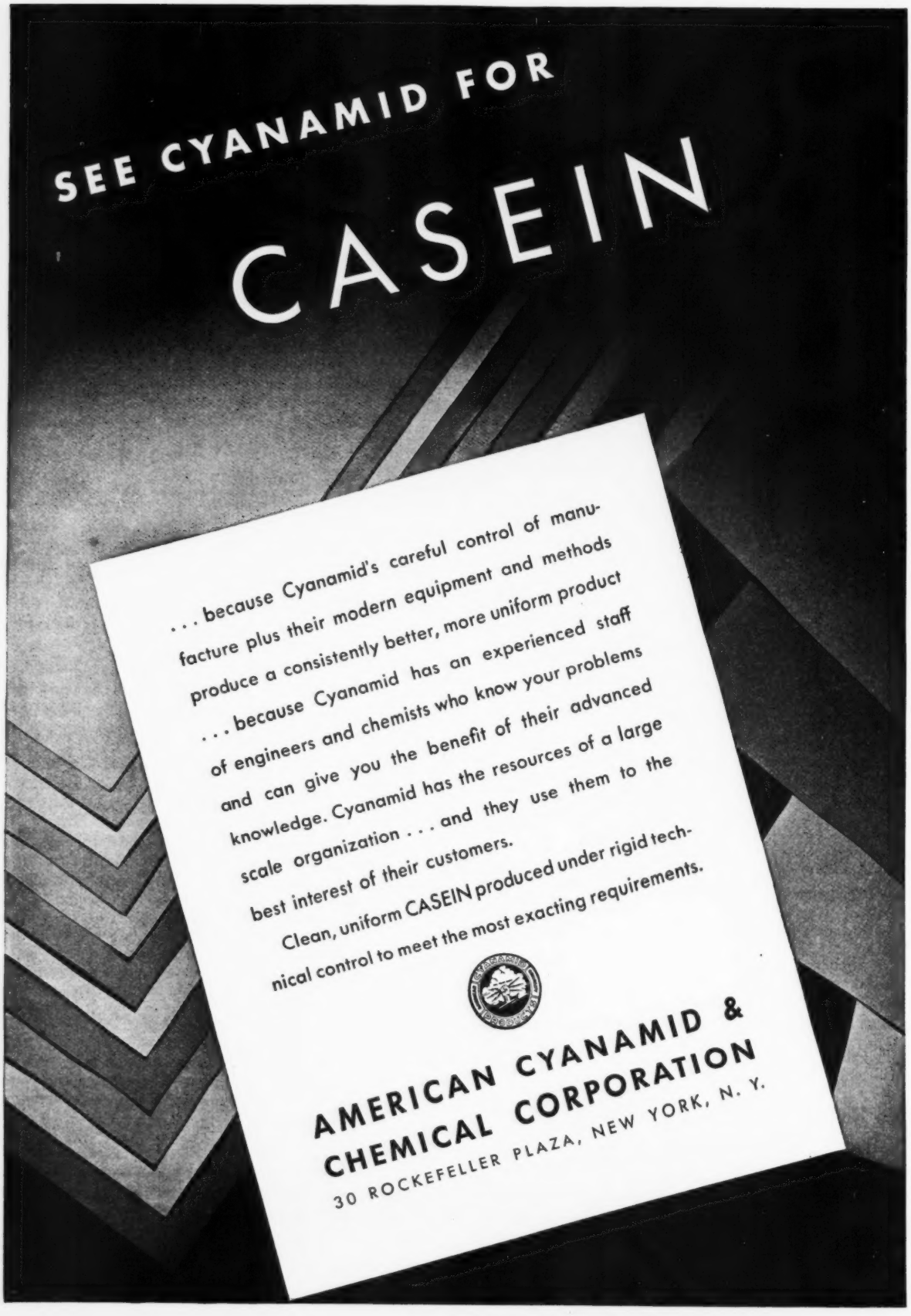
The Kalamazoo Diamond Oil Company has started the sale of motor oil in paper cans made by the Sutherland Paper Company of Kalamazoo, Mich.

For the last two months the Sutherland Paper Company has been setting up machinery for the manufacture of oil cans in its recently purchased building known as the D'Arcy property, directly across from the Standard carton and board division and the general offices of the Sutherland Paper Company. The new building is being thoroughly reconditioned and is known as plant 4.

Nearly all of the machinery used in the production of the oil cans was designed and built in the company's own machine shop. The daily capacity of the present equipment is about 200,000 cans. Additional machinery is being manufactured.

The Sutherland Company can division on North Pitcher street, is producing 250,000 cans daily for ice cream and other food products. Sutherland's daily production of paperboard is converted into the world's greatest variety of paper containers, used for packaging liquid and dry products.

F. B. Brocksus, vice president and general manager of the Kalamazoo Diamond Oil Company, says he is highly enthusiastic over the prospect of selling oil in paper cans and believes that the new Sutherland product is sure to assume an important place in the merchandising of motor oil.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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

The Necessity of Moisture Control on Paper Machines*

By H. O. Ehrisman[1]

One of the most difficult and persistent problems of the many which paper makers have to contend with, is the one of producing a sheet containing moisture of the right amount and with good uniformity. The problem has now become increasingly important because improper sheet moistures are resulting in serious economic loss, particularly to the now highly specialized printing industry. Therefore, a tremendous amount of money and effort has been spent to more fully determine the effects of moisture on paper and as well, how to measure and control it.

This problem originates with improper drying, so in analyzing we shall consider first, those difficulties arising from improper sheet moisture experienced on the paper machine. These are

(A) Variation in finish, bulk, and density.
(B) Blackening.
(C) Cockles, puckers, and grainy surface.
(D) Excessive number of breaks at dry end of machine and static electricity.

After the paper reaches the processing departments, and later the printing plant, the moisture problem becomes increasingly serious. Here we may find in addition,

(E) Blackening of sheet in super-calendering.
(F) Development of curl, buckle and wavy edges.
(G) Poor strength properties.
(H) Large sheet dimensional change due to shrink or stretch.
(I) Poor coating or printing surfaces.
(J) And other difficulties arising from those already mentioned.

Many of these problems are fully understood by the papermaker, as being due to improper sheet moistures and his timely effort may reduce their seriousness when they become evident on the paper machine. Those difficulties not so easily recognized by a quick examination of the paper can be more completely explained by reference to some recent test data on this subject.

Each of the following group of curves to be shown represent only one grade of paper and will of course be different for other grades, but all are essentially the same. Fig. 1 is reproduced from a research paper published by the Bureau of Standards *(1)*. This shows variation in strength characteristics of paper at different moisture contents. For sake of convenience, moisture is represented in terms of relative humidity. Note particularly that folding endurance and tearing strength are badly affected. Much effort is exercised by paper makers in stock preparation to obtain these desired strength properties; however, some of this effort is lost by overdrying on the paper machine. Proper moisture control is therefore necessary to assist in obtaining and uniformly controlling maximum strength.

Another important consideration is the fact that paper

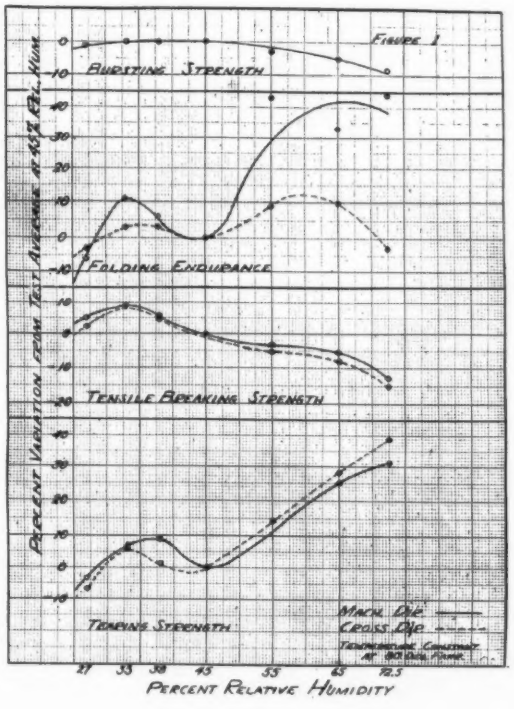


FIG. 1

* Presented at the annual meeting of the American Pulp and Paper Mill Superintendents Association, Grand Rapids, Mich., June 24-26, 1936.
[1] Atlantic Precision Instrument Co., Div. of The Foxboro Co., Foxboro, Mass.

moisture content reacts in a large degree to changes in the relative humidity and appreciably less, to the temperature of the surrounding air *(1)*. This causes well-known sheet dimensional changes which are very expensive and very serious problems in multi-color offset printing. To show how relative humidity affects sheet moisture, reference is made to Fig. 2. This curve is particularly interesting in that it shows first, loss of moisture with a successively lower relative humidity, and then second, regain of moisture with a successively higher relative humidity, temperature being maintained constant at 80 deg. Note that the two moisture curves do not retrace upon one another as might at first be expected. This characteristic is commonly known as the hysteresis effect and is an important consideration to the problem as illustrated by the following example: Referring to the upper curve, paper was taken wet and gradually dried. If it were desired that this paper be dried for equilibrium with a 50 per cent pressroom humidity, then drying should be stopped at 6.25 per cent sheet moisture. However, it has been the universal custom to overdry on the paper machine to a point where there was little or no variation, because the lack of uniform moisture control results in calendering difficulties. In our example this would extend the curve probably to 3½ per cent moisture or less. This paper then is of course too dry, so later when exposed to the required 50 per cent pressroom humidity it naturally regains, but, due to the hysteresis effect, it regains to equilibrium on the lower curve and only to 5.1 per cent moisture as shown. In coming to equilibrium, this paper would suffer serious dimensional changes, curling, and wavy edges.

Press Room Conditions

Now if paper is brought to equilibrium by the customary though expensive, individual sheet, pressroom hanging process, the bad effects are reduced but not eliminated. This fact, although not generally recognized, is established by test results recently published in another research paper by the Bureau of Standards *(2)*. This shows that paper which reaches equilibrium with pressroom air by

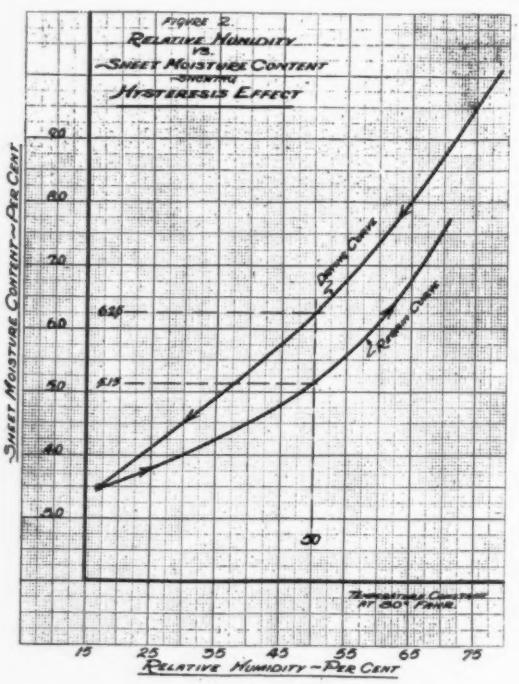


Fig. 2

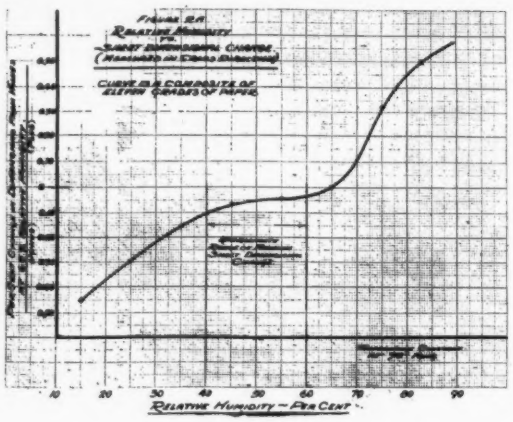


Fig. 2A

regain as just described, will, despite its existing equilibrium condition, pick up at least 0.5 per cent additional moisture from the printing process and this will cause further serious sheet dimensional change during printing. The important point is, that even after gaining this printing moisture, the sheet is still in equilibrium with the 50 per cent pressroom humidity. The reason for this lies in the hysteresis effect, which makes it possible for the paper in our example at the 50 per cent humidity, to hold any moisture from 6.25 to 5.1 per cent, depending entirely on its previous drying history. Water, wetting the paper during the printing process, causes the paper to gradually readjust itself within its hysteresis limits from the lower to the upper curve, where it can hold considerably more moisture, yet be in equilibrium with the pressroom humidity.

Now, in contrast, if drying is stopped on the upper part of the hysteresis curve at the correct point corresponding equilibrium with the prescribed pressroom humidity, then preconditioning by hanging is unnecessary and therefore, the paper may be printed immediately. Furthermore, this paper cannot hold the added moisture gained in printing because it already contains the maximum moisture possible within its hysteresis limits at the 50 per cent humidity. Still more important, the paper then will not change dimensionally during the printing operation thus eliminating this serious problem.

Correct paper drying is therefore to be very much desired by all concerned. In our example, the overdried paper is sold with 3.5 per cent moisture by weight whereas the correctly dried paper is sold with 6.25 per cent moisture. This added 2¾ per cent moisture would represent a very large financial gain for the paper manufacturer and still more important would greatly increase the quality of the paper, freeing it from the serious printing problem as described and eliminate the necessity of preconditioning in the printing plant.

Fig. 2A is another interesting curve in this connection taken from tests conducted several years ago *(4)*. This shows sheet dimensional change with variation of its moisture content which, for purposes of convenience, is again expressed in terms of relative humidity.

As the paper dries from the wet state, its dimensions change very rapidly until reaching approximately 60 per cent humidity, then there is a decidedly slower change until reaching 40 per cent humidity, after which the rate again becomes very rapid. From 40 to 60 per cent humidity corresponds approximately to the sheet moisture range of from 5 to 7 per cent and is seen to be the range of minimum sheet dimensional change.

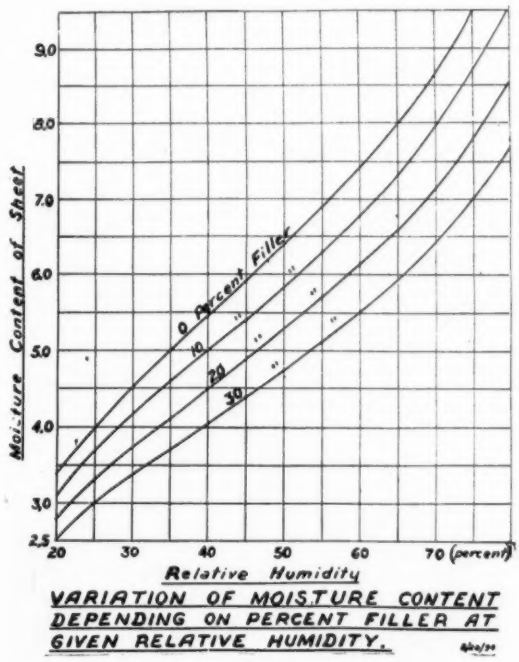
At the same time that the sheet changes dimensionally, its individual fibers are of course also suffering a similar change. As they are dried, particularly below the 40 per cent humidity equilibrium condition, the fibers lose their original plasticity and strongly tend to curl and kink on themselves and this becomes very pronounced in the usual practice of overdrying paper to 4 or 3 per cent moisture content. With the fibers in this badly curled and kinked condition, the sheet is then calendered which process practically locks the fibers in their strained positions, and this results in a sheet having considerable internal strain. Now, when this overdried paper is exposed to a normal relative humidity, the fibers regain a part of the moisture lost, but if once overdried, they never fully regain their original plastic condition. However, the moisture that the fibers do regain will tend to make them straighten out and uncurl, but, due to the fact that they were locked in position by the calendering operation, they cannot change their relative position. This tendency to straighten out and uncurl, therefore, simply sets up additional strains within the paper.

Thus, when we have a sheet of paper which has been overdried and then allowed to regain by exposure to a normal relative humidity, we have a sheet in considerable strain due to the curled, kinked positions of the individual fibers, and also to the strain of these overdried fibers trying to straighten out and return to their original moist conditions. This condition of the sheet is responsible for a considerable part of paper curling difficulties.

From the curve, Fig. 2A, we can therefore see the obvious advantage in leaving sufficient moisture in the sheet for equilibrium with a 50 per cent humidity. A sheet dried only to this point will be in the approximate center of the range of minimum sheet dimensional change. Furthermore, the individual fibers then retain sufficient moisture to preserve their original plastic condition and will therefore remain fixed in position and relationship thus giving a sheet which will lie flat and handle correctly.

Proper Moisture Content

In determining the correct sheet moisture to carry for equilibrium with a given relative humidity, it is necessary to make certain other considerations. It has long been known that different grades of paper require widely different moisture contents for equilibrium with identical humidity conditions. This is due to differences in moisture-holding capacity of different types of fibers and in their degree of hydration. Further investigations *(3)* disclose that even similar grades of paper show an equally large variation in this respect. This is mainly due to difference in amount and kind of filler used. Each filler material has its own characteristic moisture holding capacity, so it is evident that the addition of such materials will affect the capacity of paper to hold moisture when exposed to given humidity conditions. Fig. 3 shows data on variation of sheet moisture content depending both on per cent filler in the paper and the humidity to which sheet is exposed. Note the wide variation in sheet moisture for any one humidity with additions of filler to identical sheets and furnish.



VARIATION OF MOISTURE CONTENT DEPENDING ON PERCENT FILLER AT GIVEN RELATIVE HUMIDITY.

Fig 3

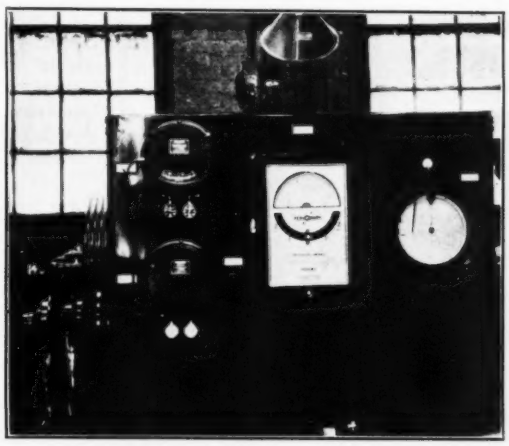


Fig. 4

The Verigraph

A more complete knowledge of the effects of moisture on paper quality makes it evident that higher and very uniform sheet moistures must be produced and these in terms of sheet humidity equilibrium conditions. The Foxboro Verigraph moisture control has been developed for this exact purpose. By means of this instrument, a continuous precision measurement of the moisture content of the paper is effected as it comes off the paper machine, and more important, it automatically regulates the steam to the driers, thereby keeping the moisture at the proper point.

The fundamental operating principle of the Verigraph can best be described by an analogy. If a small box is tightly placed on the sheet at the dry end of the paper machine, so that the sheet acts as the sixth side of the box, sealing it from atmospheric room disturbances, then the "space" within the box will quickly arrive at the relative humidity equilibrium condition corresponding to the sheet moisture and sheet temperature. This is of course brought about by the same action that causes paper to lose moisture to an equilibrium condition when exposed to a dry atmosphere. If a precision balance were within the enclosed space of this box, with a hygroscopic material like paper on the weighing pan, then this material would come to moisture content equilibrium with the humidity and temperature existing in the space. Any variation in sheet moisture, would change the enclosed space humidity and would result in a corresponding change in weight of the hygroscopic material. Scale deflections would therefore give an exact indication of sheet moisture in terms

of its humidity equilibrium and temperature conditions. Rapid and very precise weighing of the necessarily small moisture changes in the hygroscopic paper material, would, of course, be mechanically impossible. However, it was made possible, by adapting the same principle used in a precision weighing instrument which was developed for and which has been very successfully used by the rubber industry during the past ten years.

Instead of paper, individual treated silk fibers are used as the hygroscopic material. Silk in this form, reacts much more quickly than would paper to sheet moisture changes and fortunately, silk has approximately the same moisture holding characteristics as does paper with respect to sheet humidity equilibrium and temperature conditions, all of which is very important. Instead of being in a weighing pan, the silk fibers are placed in small perforated radio condensers, which are mounted in a box on the dried sheet as previously described. By using radio frequency current, obtained by conversion of lighting circuit power, the moisture gained or lost by the silk is electrically weighed with extreme precision, indicated and recorded on a suitable meter, which in turn carefully regulates the steam valve to the driers.

Fig. 4 shows a typical installation. The knob at bottom of instrument case is simply set for the desired sheet moisture in terms of equilibrium humidity. The white indicating ball registers per cent moisture variations from the normal or "zero" point, the same mechanism records these variations on a chart. With the control switch "on," drier temperatures are automatically controlled to maintain the white indicating ball on "zero." Uniform sheet equilibrium conditions are thus maintained despite variations in kind or amount of filler materals used in the paper.

Fig. 5 shows the mounting of the small hygrometer box on the dry end of paper machine. A cable electrically connects this unit with the recording-controlling instrument.

Fig. 7 is a sample chart record taken from the Verigraph, and shows uniformity of moisture obtained with this automatic moisture control. Note that throughout the 24-hour period, moisture variation was generally maintained within 0.25 of 1 per cent. Also, note the rapid response of the instrument to moisture changes which is most apparent at a paper break, during which time the hygrometer being exposed, measures the relative humidity of the room. This chart was obtained from a single drier section machine and on a run of Postcard stock, a comparatively heavy paper.

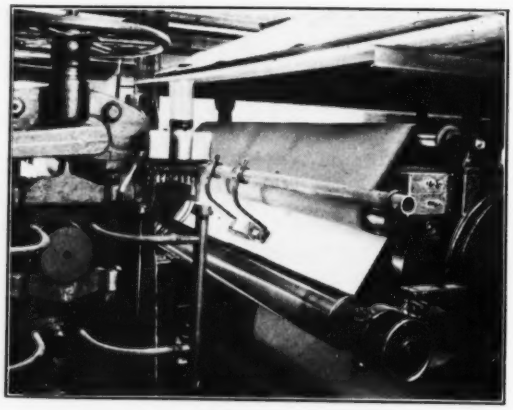


FIG. 5

Fig. 8 is a similar chart record obtained from a two drier section machine, with size tub in between, and on a run of envelope paper.

The use of this instrument can therefore distinctly minimize and largely eliminate the moisture problem earlier described. Charts alone tell only part of the story, their comparison is striking indeed, but what comparisons the paper maker can see in a very much improved paper finish with its increased uniformity is still more important. Of course, former calendering methods have had to be changed to adapt them to the higher moisture levels. Generally, this was accomplished by reducing pressures or taking out "nips," and this in turn directly results in improved sheet formation.

In conclusion, accurate moisture control on paper machines has become absolutely essential, and its use will result in higher sheet moistures, reduced manufacturing difficulties and reduced steam consumption. This will result in increased profits, but most important, will give the paper buyer a more uniform, higher quality product, and where necessary, with moisture content to suit his press-room conditions.

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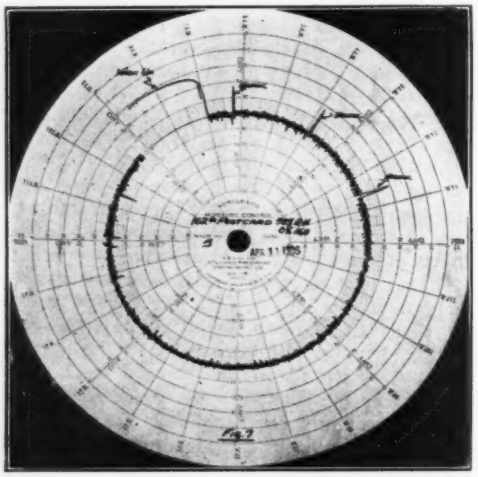

FIG. 7

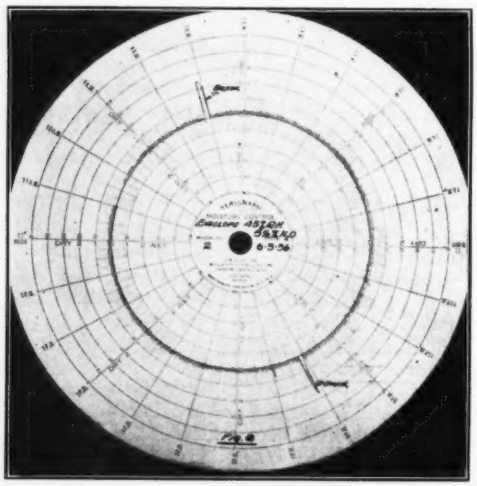

FIG. 8

Paper Machine Rolls from a Rubber Man's Viewpoint*

By W. L. White[1]

It seems desirable, before talking about paper machine rolls, to stop and discuss the properties of this wonderful material known as "rubber." It is interesting to know what it is, where it comes from, and what special properties make it suitable as a roll covering material.

Rubber is an elastic solid obtained from a milky liquid known as "latex" which occurs in special tubes in the bark of many plants, shrubs, and trees. It is a complex hydrocarbon of which the structural unit is the isoprene molecule. It contains only hydrogen and carbon in the ratio of five parts of carbon to eight parts of hydrogen. Chemically rubber is quite inert toward most materials.

The physical properties of rubber are the most interesting. It is a soft, tough, elastic material. Its most characteristic property is that it can be repeatedly stretched to many times its original length, only to return, when released, to approximately its original dimensions. It is this last property which makes rubber so important to our modern civilization, since no other material, with the exception of the new synthetic rubbers, comes anywhere near approaching it. Without rubber for tires, I am afraid our automobiles would be quite useless.

Sources of Rubber

Practically all rubber today is obtained from the para rubber tree, "hevea brasiliensis," a tropical evergreen tree indigent to South America.

Columbus is credited with being the first white man to discovered rubber. It is said that he found the Indians playing with rubber balls on his second voyage to America. Although rubber was first discovered and used in South America, very little rubber now comes from this source. Rubber, as far as South America is concerned, seems to have gone the way of the Indian. Ninety-eight per cent of the world's present supply now comes from the huge rubber plantations in Ceylon, Java, and Sumatra where the descendants of original seedlings, smuggled out of Brazil by a smart Englishman, are cultivated.

In contrast to the wild jungles of South America, where rubber was first found, these rubber plantations in the Far East are cultivated and cared for in a way similar to our best fruit orchards.

Rubber is obtained by what is known as "tapping." This operation is done by skilled natives who make a diagonal cut in the bark of the tree. They make their cut with a sharp knife or special tool and cut the bark about one third the way around the circumference of the tree with a diagonal downward motion. Care must be taken not to cut too deeply so as not to touch the cambium or inner bark; otherwise the tree would be permanently injured. "Latex," contrary to the general impression, is not the life sap of the rubber tree, but is a protecting fluid contained in special tubes placed between the inner and outer bark of the tree. Its purpose is to protect the tree from insect bites and to heal over any wound in the bark when the tree is bruised, in a manner similar to that of pitch in a pine tree. When an insect bites into a rubber tree, he first gets a mouthful of sticky latex before he can get to the sap of the tree. He quits then and there. This operation of tapping is repeated every morning, because the latex oozing out of the cut heals it and stops the flow. One can appreciate how delicate this operation of cutting the bark is when he realizes that a full month's cutting should not use up more than 1 inch of the bark. A tapper begins work at dawn, and he has tapped from 200 to 500 trees by 9:30 A. M. when he stops tapping and begins to collect the latex from the trees he has tapped. The usual yield for a tree in a tapping is from 2 to 4 grams—just a fraction of an ounce; 2 pails of latex is an average day's work for a tapper. The average yield per acre is about 400 pounds, although some highly cultivated plantations are yielding as high as 1,500 pounds. With the present price of rubber at about 16 cents a pound, the ordinary plantation has a gross return of about $64.00 per acre per year.

The native deposits the latex which he has gathered in large tanks at the plantation. It is then carefully strained to remove foreign matter and dirt, after which it is coagulated. Latex is coagulated by simply adding formic or acetic acid to it. After coagulating, the latex is allowed to settle, and the rubber rises to the top of the tank like cream in a milk bottle. This curd or coagulum is skimmed off and is pressed into sheets by passing it through a series of heavy rollers which remove the water and squeeze it into a sheet the way you felt a cake of paper pulp. The pressed sheets are then air dried to make light rubber, or are dried in a smoke house to give smoked sheets. These sheets constitute the better grades of commercial rubber.

Rubber Latex

Rubber latex is a most interesting material. It is quite similar in makeup to ordinary milk. It consists of tiny globules of rubber hydrocarbons suspended in a serum consisting mostly of water. Each little globule of rubber is surrounded by a film or membrane of a nitrogenous material which acts as a protective colloid. This protective colloid is simply a jacket which surrounds each particle or globule of rubber and prevents it from coming in contact with another particle of rubber. If it were not for these jackets, the particles of rubber, on touching each other, would coalesce and stick together. Anything which can destroy this protective coating and thus tear off the jacket from the rubber particles, will cause the latex to coagulate. Acid, friction, heat, or bacterial action will curdle latex and coagulate it in a manner similar to the way milk sours. The fact that latex sours when allowed to stand in hot places very probably retarded the development of the rubber industry for two centuries.

The Indians were the first rubber manufacturers because they could use the fresh latex for waterproofing their shoes, water bottles, and clothing before it had a chance to sour. When the white man tried to send latex to Europe, it always spoiled in transit and was quite useless upon arrival. Of late years the chemist has studied

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latex and has found that this souring and coagulating can be easily prevented by adding sufficient ammonia to the fresh latex to preserve it. Today a new branch of the rubber industry has grown up in which latex, directly from the trees, preserved by ammonia, is used for making dipped goods, boots and shoes, and many sundry materials. In the old days the only way man could preserve rubber was to coagulate it and ship it in the form of smoked gum. When this gum arrived in Europe, it remained a curiosity because no one knew how to make use of it. Joseph Priestley, the discoverer of oxygen, found that this gum was excellent for wiping pencil marks from paper. Consequently he called it "India Rubber."

Gum rubber, as it is made from latex, is a tough, waterproof material which, after being worked mechanically can be easily dissolved in solvents to make cement. This cement can be spread on cloth to waterproof it. Gum or crude rubber, as we know it, has one very bad physical property. It is thermoplastic; that is, it gets soft and sticky when hot, and hard and brittle when cold. The earliest attempts to use rubber were for waterproofing clothing. If the weather remained mild, you had a soft, satisfactory garment. If the weather became hot, your coat turned to fly-paper, and when the weather became cold, your garment became so stiff it would stand up by itself.

Beginning of Rubber Industry

The inception of the rubber industry can be traced back to a patent issued in 1791 to Samuel Peal. This patent was for making waterproof cloth by spreading on the cloth a rubber cement. About 1820 Hancock in England and MacIntosh in Scotland began the manufacture of this type of cloth on a large scale. MacIntosh made his name history and himself wealthy by simply spreading the cement on two pieces of cloth and then sticking the two rubber surfaces together. The rubber layer was thus protected by the cloth. Although it might get sticky on hot days, it could not cause any trouble. MacIntosh's business was so successful that one, even today, associates the name MacIntosh with the raincoat, and some automobile sport topping fabric is still made by this method.

The mild weather of England was a great help to the early English rubber industry, as it fell in that range of temperature where natural rubber is flexible without being sticky. When attempts were made to introduce the use of rubber for waterproofing into America, the wide variation in temperature which we experience in the year spelled disaster, especially in Boston where the pioneer rubber factory was located.

The infant American rubber industry was just about dead, and they were ready to bury the corpse and call it a day when along came a man whose name will always be associated with rubber and the great industry built on rubber. That man's name was Charles Goodyear, a Connecticut Yankee who was nothing short of being a genius. He was that type of man who is always associated with great American inventions. He had been in the hardware business and had proved a failure. Walking down the streets of New York one day, he happened to see a life preserver in a store window with a sign on it saying that it was made from India rubber by the Roxbury Rubber Co. This incident immediately inflamed his imagination, and he resolved to find out more about rubber. Obtaining for himself samples of crude rubber, he began experimenting, and he became so enthusiastic about the possibilities of it that a man looking for Goodyear one day was directed to go over to Long Island and look for a man who was wearing rubber trousers, a rubber vest, a rubber coat, and a rubber hat.

Goodyear realized that, if he only could find a method of removing from rubber those disagreeable properties of getting sticky when hot, and hard when cold, he would have found one of the most useful materials available to man. Goodyear experimented continually and used rubber in the manufacture of many articles. He started many plants and got his friends to invest money in them, only to end as a dismal failure because, as soon as "old man sunshine" came out and the temperature went up, Mr. Goodyear's rubber articles fell to pieces. Goodyear one day spread sulphur on the surface of rubber because a certain John Hayward had told him that it removed the tackiness from the rubber. In a gesture of despair, he dropped this sulphur coated piece of rubber on the top of a hot stove. Most of the rubber shrivelled up and charred, but he noticed that around the edge of the charred rubber there was a fringe which had not charred, and this seemed different from the rubber which he had been using. This fringe of rubber was not tacky, nor did it get hard when exposed to the cold. He mixed up some more rubber, and this time he actually put the sulphur into the rubber, put it on the back of the stove, and heated it. When he took this rubber out and buried it in a snow-bank, it still remained soft and flexible. This great discovery is what is known as "the vulcanization of rubber." Even today, nearly 100 years after Goodyear made this discovery, the process of vulcanization, upon which is based the entire rubber industry, is fundamentally the reaction between sulphur and rubber. The modern chemist has made many improvements, to be sure, but everything he does is simply an improvement on what Charles Goodyear did when he dropped the rubber on the top of a hot stove.

Rubber in Couch and Press Rolls

Let us turn now to the use of rubber in a couch or press roll such as you receive at your mill. The rubber is received from the rubber plantations in crates holding about 250 lbs. No reputable rubber company in the roll covering business uses anything but the finest grade of rubber in its roll compounds. The compounding of rubber to be used for roll covering is a very special branch of the rubber industry. It does not follow the usual rules of the game, and to be successful one has to use the utmost care in preparing compounds. The rubber which is used in these compounds is not any kind of rubber picked up on the open market, but rubber which has been specially selected because it is known to give good results. The usual procedure is to use, not only the best grade of rubber obtainable, but also only rubber from selected estates. This rubber, as it is received at the rubber factory, is blended on huge rubber mills to make what is known as a "rubber base." This is carefully tested, and if it passes all tests satisfactorily, it is put aside to season and is used as a base for mixing roll compounds. To make rubber vulcanize, there is only one ingredient necessary: namely, sulphur. If you simply mix rubber and sulphur on a mill and heat the mixture long enough, you will vulcanize the rubber. How good the vulcanized rubber will be is another question. Rubber roll compounds are certainly not made that way. At our factory we use about 50 ingredients in our compounds, and we use no material simply for the sake of adding another item to our inventory list. Every drug we use must contribute some useful property to the finished compound. The materials used in compounding rubber, however, may be divided into 7 classes, and I will name them in the order of their importance: Rubber, sulphur, reinforcing pigments, accelerators, activators, softeners, and antioxidants.

By mixing with rubber the correct amount of sulphur, the right amount of the proper kind of pigment, along with

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the correct accelerator in the exact amount, and then giving the mixture the correct cure, based on the nature of the compound, the size, shape, and weight of the iron center being covered, the rubber chemist is able to supply the paper mill with any hardness of rubber roll cover from a plastometer reading of about 400 with a ⅛ inch pin to a rock hard roll testing about 0.

It seems simple enough, when one talks about it, but it really is a difficult assignment when one considers all the variables that enter into it. However, it is not sufficient to simply make a roll which will have the required hardness, it must be the kind of roll suitable for the job it is called on to do. Possibly it must be able to stand heavy loading without heating up or corrugating, and it must have good abrasion resistance and cold flow; otherwise it will quickly lose its crown. It must be lively, have a good set, good resilience, and, of course, it must age well. How to get all those properties in a rubber covered roll is a roll compounder's problem. I believe a better roll covering is being made than has ever been made before. The rubber chemist, however, cannot take all the credit for this advancement. He has been helped along by the organic chemist who has graciously supplied him, at a price, with some very good tools, namely, synthetic organic accelerators, to speed up and to improve the vulcanized rubber, and some chemicals called "age resisters or antioxidants" which help the rubber to retain its original good properties and not harden up due to the deleterious action of the oxygen of the air and action of light. In the old days it was a common occurrence to have checked rolls, especially in the medium hard range of density, say, between 15 and 40 plasto. That range of rubber compound was considered by the chemist to be the mongrel range. It was neither hard nor soft rubber, but was sort of a mixture of both, and was always troublesome. If the raw rubber, the mixing and milling, cure, and everything which entered into the makeup of the roll was just right, you would probably get a roll which was a good "ager." The roll might last 20 years and give good service. On the other hand, if one little variable was just the least bit off, the roll might check in a month and sometimes even in days. Today, thanks to our greater knowledge of rubber compounding and the better tools we have to work with, such checking is rare.

Rubber Milling and Calendering

In order to prepare the gum rubber for roll building, we have to mix with it many other ingredients in order to give the rubber the necessary properties which we desire it to have. This operation of adding these ingredients or "drugs," as we call them is known in the industry as milling, because the drugs are added to the rubber in a machine known as a mill. This machine consists of two heavy steel rolls set in a heavy cast iron frame. The working of the rubber between these heavy rollers grinds into it the various drugs which we wish to add. In the preparation of roll compounds the greatest care must be exercised to avoid getting any dirt into the rubber. The crude rubber is first passed through huge straining machines which look like giant meat choppers. These remove from it any foreign material which may have gotten into it in its long trip from the rubber tree to the factory. Likewise, all drugs and chemicals used in the compound are first sifted through fine screens to remove any foreign material or perhaps large lumps, since these may go unbroken through the mixing operation and leave hard spots in the finished roll. In the preparation of compounds to be used on rolls where the surface must be absolutely perfect, the compounded rubber may again be strained through these huge strainers after mixing.

As soon as the batch is mixed and properly numbered to identify it, a test sample is taken and is sent to the Control Laboratory to be tested. Here a group of boys slap it into small presses and give it a predetermined cure set by the compounder. After curing, this rubber sample is put through a series of tests to determine whether or not it has been properly mixed and is suitable for making up rubber rolls. While this sample of rubber has been going through the test in the control laboratory, the batch of rubber from which it was taken is switched to a room where the untested stock is kept. As soon as it has passed all the tests, it is marked "okeh" and is put in stock to wait until called for.

The rubber comes off the mixing mills in the form of slabs about ½ inch thick. In order to get it into a form suitable for roll making, it must be put through an operation known as calendering. This is done by putting the rubber slabs through a huge machine known as a calender. This machine is quite similar to the finishing calenders used in paper mills. It simply rolls out these slabs of rubber into long sheets which are then used for building up a rubber roll. The rubber is passed through the calender several times and each time an additional layer of rubber is applied to the sheet until the required thickness has been built up.

Roll Building

The average person has an idea that rubber rolls are made by melting up rubber and then putting the roll center into some kind of a mold and pouring this melted rubber around it, and after the thing has been properly baked, one opens the molds and out pops a rubber roll. We often wish we could make rolls that easily. However, the actual way a rubber roll is made is to take the sheet of calendered rubber, which we have been talking about, and wind it around and around the iron center the way you would wind up a roll of ribbon until the desired thickness has been attained. After each ply of rubber is applied, it must be carefully rolled down with steel rollers. Any air blisters, any specks of dust must be carefully removed. Every operation of making up this roll must be handled with the greatest care. It is just too bad to go through the whole operation of putting about one half ton of rubber on a large roll only to find a bad blemish in the surface when the rubber has been buffed down! Roll building is done by teams of from two to five skilled workmen who are blessed with good eyesight and the ability to work carefully at all times. This is no job for a careless man or one who likes to sleep standing up. These men work in unison like a football team, each man's work overlapping that of the next just enough so that no spots on the rolls are overlooked. On a rubber roll, you sell surface. The surface goes all the way through. If the surface is not perfect, it does not matter how good the rest of the roll may be, the roll is quite useless.

I have here what I call a "demonstration roll." This roll is so made that it shows, in its different sections, every stage in the makeup of a roll from the iron center, ready for rubber covering, to the buffed rubber surface on the finished roll, as you receive it at your plant. The sections are numbered from left to right as follows:

1. Iron center as received at the rubber factory.
2. Threaded or blasted surface.
3. Rubber cement or adhesive.
4. Hard rubber base stock or tie ply used as an adhesive or binder between the metal center and rubber.
5. Face stock.
6. Wrapped roll ready for vulcanizing.
7. Rubber roll as taken out of vulcanizer with wrapper removed.
8. Finished roll surface.

Roll Center: Needless to say, it is necessary, if one is going to make a good rubber roll, that one start with a

good sound center. A good center is as necessary to a roll as a good foundation to a strong building. Yet, in many cases, we have to handle, at our plant, centers which should never be used in making up first class rolls. When a roll comes to us for covering, we either receive an old roll with a worn-out rubber cover or a new iron center right from the foundry or the machine builder. A good center will have the following characteristics:

It will be strong enough so that it will not flex under the load.

It will have an even wall thickness all around so that there will not be any weak spots, and the roll will be in proper balance.

CLEANING AND ROUGHENING ROLL SURFACE: In order to get good adhesion to the metal, it is necessary that the scale and dirt on the surface of the iron center be removed. This can be done by sand blasting, or threading. Sand blasting or cutting a thread are the usual present-day practices; both give excellent results.

CEMENT OR ADHESIVE: A coat of rubber cement or a rubber to metal adhesive is now applied to the clean center. This serves a double purpose. It protects the cleaned metal from the atmosphere and also makes a more intimate contact with the metal than could a solid material like a sheet of rubber.

HARD RUBBER BASE: A thin sheet of a hard rubber base stock or some other binder material is now applied. This is applied by laying on a sheet of rubber and rolling it down carefully by hand with steel rollers. The rollers force the rubber down into the interstices of the thread, and at the same time force out any air so that the rubber makes a tight bond to the metal. In the old days the roll manufacturers used to have a great deal of trouble in trying to get their rubber covers to stay on the rolls. If one goes through the patent literature, he will find all kinds of patents calling for the incorporation of blood and other sorts of queer materials, even the use of wire and cord to lock this rubber on to the metal centers. Today there are in general use, two methods of getting adhesion between the rubber cover and the metal center. One is by means of a thin layer of hard rubber $\frac{1}{16}$ to $\frac{1}{8}$ inch thick, and the other is by the use of a thin layer of a binder material, usually made from depolymerized rubber. Both methods have their merits and their advocates. I won't enter into a controversy as to which method is better, because under certain conditions one method is good; and under other conditions the other method is better. We use both methods judiciously.

FACE STOCK: After the base stock has been applied to the roll, it is followed by the face stock. The face stock is properly compounded to give the requisite hardness, abrasion resistance, and other characteristics which are necessary for the job which the roll has to do.

WRAPPING: The next step is wrapping the roll. The roll, after makeup, is wrapped with cotton tape to compress the rubber and to hold it under pressure during the cure.

VULCANIZATION: For vulcanizing, the rolls are put into large autoclaves and cured by bleeding in steam under pressure.

BUFFING: After vulcanizing or curing, the cotton wrapper is stripped off and the roll is ready for the finishing operation or buffing. This is accomplished by grinding the rubber roll in a lathe or grinder with special grinding wheels. This grinding is usually done dry. If the roll is crowned, the crown is ground in during the grinding operation.

TESTING: Except for testing, the roll is now finished. All rolls, before being shipped to the customer, are tested. They are tested for size by calipering them with a micrometer. Some rolls specify that they must be held to size with a tolerance of plus or minus .002 inch. If the roll is crowned, the crown is checked to see that it is accurate with a crown indicator micrometer. The density or hardness of the roll is determined by an instrument with which you are all familiar, the "plastometer." On the back of every order is a printed table, and in this table is listed plastometer readings taken across the face of the roll on each third of its circumference. These readings are uniform throughout the entire cover.

This, gentlemen, brings us up to date in our story about rubber rolls. One may wonder what he can expect of rubber rolls in the future. Every reputable rubber company in the roll business maintains a large laboratory in which trained men continually carry on research work, endeavoring to improve the quality of their rubber roll covers or to make covers which are more suitable for some of the special uses to which rubber rolls are put. I have here a picture of a three roll testing calender. This machine is used for testing experimental sample rolls. A roll about 4 inches long and 3 inches in diameter is made up using the compound which is to be tested. This roll is then put into this testing machine, and it can be run under any desired conditions of loading until failure. In this way we are able to compare the merits of various rubber compounds in the laboratory before attempting to use them on large rolls. With the aid of data compiled in this manner, roll compounders have been able to materially improve the quality of their stocks.

Everybody has probably heard of the new synthetic rubbers which have been put on the market. These rubbers may or may not play an important part in the roll covers of the future. To date they have been used to a limited extent in the printing roll field and are giving a good account of themselves. For the general run of rubber roll covers, however, they do not seem to be necessary because from our present knowledge, they do not appear to add anything to the properties required of good roll covers. The greatest asset of these new synthetic rubbers is their resistance to oil, ozone, and other things which do not usually come in contact with a paper mill roll. For general interest, I have brought along a couple of small rolls made from these synthetic rubbers or rubber substitutes. One of these rolls is made from what is known as Thiokol. The other is made from the synthetic rubber called DuPrene. To call either material a synthetic rubber is probably a misnomer because neither one is rubber, but they have properties in some respects closely resembling rubber. They can be used in place of rubber for certain purposes. Chemically, Thiokol is not, in any way, like rubber. It was invented by a Dr. Patrick who happened to be looking for a new material which he might use as an anti-freeze in his automobile radiator. He happened to drop some ethylene dichloride into sodium polysulphide, and the result was a gooey precipitate which, when purified and compounded with certain drugs, gave a material which seemed to have some physical properties similar to rubber. This material is probably about as oil resistant as any rubber-like material.

The other material, DuPrene, is quite similar to rubber, and it is made from acetylene and hydrochloric acid. It is the outcome of long researches carried on by a scientist, Dr. Neuland, at Notre Dame University, and it was finally made a commercial success by the Dupont Company. It has properties more closely resembling rubber than any synthetic rubber or rubber-like material in commercial use today. It has the added feature of being much more oil resistant than rubber. You hear much also about several synthetic rubbers which have been developed in Europe. Whether or not they will prove themselves to be better than what we have in this country, I am not able, at this time, to tell.

Mill Performance of Artificial Pulp Stones*

By R. I. Wynne-Roberts[1]

"Time marches on," the radio program says, so that it is interesting to recall that it is only little over ten years ago that the Norton pulpstone made its first bow to the paper industry. Since then we have installed well over seven hundred and quite a number of mills are now one hundred per cent equipped with them. In fact, today, we are proud that Norton stones grind over thirty-five per cent of the ground wood manufactured in the United States. This is an enviable record of accomplishments.

The structural make-up of the stone is sufficiently well known, I believe, so that a detailed description at this time would serve little purpose. The present mechanical excellence of the Norton stone is not an achievement of the moment but the result of many years of careful study and development in which the suggestions of our many customers have played an important part. Grateful acknowledgement of this help is hereby given. But what you are most interested in at this time is the stone's record of accomplishment.

Mill experience with the Norton stone has demonstrated beyond a question of a doubt that the artificial stone possesses many advantages, amongst which may be listed the following major ones. These are not idle statements but are facts, proven not in one mill, but in many.

Adjustment of Stock Quality

The quality of stock may be adjusted to meet any requirement and the product may be continuously maintained exceptionally uniform throughout the burring cycle. By virtue of the fact that stone specifications may be chosen to fit the particular mill requirements, optimum stock quality may always be reached under the existing operating conditions. The very much lower frequency of burring eliminates to a great degree fluctuation in stock quality. In addition the stone surface retains its cutting edge so there is not the rapid dulling of the surface common to natural stones.

Inasmuch as the stone is an artificial product, its manufacture can be definitely and accurately controlled so that stones of like specification will be similar in grinding characteristics whether made this year or five years hence.

The stone wear is very low, resulting in a life many times that of the natural stone. The average wear is approximately one cubic inch per ton of pulp compared to about 15 cubic inches for natural stones.

The artificial stone responds more readily to surface dressing and the impression is always definite and clear cut. Natural stones average by and large 3 to 4 sharpenings per day. Norton stones sustain a burring cycle of from 1 to 6 days in length, depending on the grade of pulp being made and the quality and species of wood being used.

The burr cost per ton of pulp is low. As a matter of fact assuming a 24 hour burring schedule, which is unusually short, the additional yearly cost of burrs for natural stones will be approximately $200. This represents a considerable item of saving for the artificial pulpstone. For burring cycles longer than 24 hours, into which category fall most of the stones used, a further saving may be anticipated.

A higher daily production is usually obtained. At the same power input to the grinder, other conditions being equal, Norton stones produce from 5 to 20 per cent more pulp depending on the type of pulp made and the kind of wood used.

The slow rate of wear of artificial stones requires less frequent setting of the grinder pockets. This means the prevention of slabs, definitely limiting wood waste and inhibiting stone burrs. Artificial abrasive resists heat shock more readily than sandstone so that the tendency for the stone to burn is diminished.

While artificial stones cost more initially, the unit cost per ton of pulp is ordinarily less than that of natural stones. A stone cost of from 5 to 6 cents per ton has been continuously maintained in a news mill over a long interval of time. Usually the cost is somewhat higher than this but based on comparison over a sufficient period of time to include low and high cost sandstones, the average cost of artificial stones has been less with very few exceptions.

The Norton stone consistently produces quality pulp with less waste. Did you ever stop to think what one half of one per cent less waste means in the course of a year? With a 54 x 27 inch stone some fifteen tons of pulp will be salvaged. The conservative estimate of one per cent less waste by using Norton stones is commonly reached.

Artificial stones possess a factor of safe operation that tends to minimize stone breakage. Minor repairs are sometimes required but the complete collapse of the stone such as frequently occurs with natural stones has not been experienced with Norton stones of standard specifications.

Applications

The original artificial stones were used in the production of news pulp. Today they are used to make any and all types of ground wood pulps. It may be of interest to note a few particulars. The difficulty of reducing data from mill to mill to a strictly comparable basis makes it impossible to give precise data without conflicting exceptions.

BOARD: Coarse grained stones, fairly hard are used. This is a high freeness coarse stock normally calling for the frequent application of coarse burrs to maintain the high production rates that are required.

HANGING: Freeness will vary from 150 to 300 ccs. (Canadian Standard) requiring medium gritted stones of normal hardness. The artificial stone is particularly valuable in maintaining the high freeness pulp of good quality that is demanded. Excessive sharpening would be necessary with natural stones with the consequent fluctuation in freeness. A moderate sharpening every 30 to 60 hours will suffice to hold the freeness when Norton stones are used.

NEWS: Several grit combinations have been found very successful, depending upon the type of grinder used and the quality of pulp required. Freeness varies on the average from 80 to 150 ccs.

In Canada on continuous grinders medium gritted stones of normal hardness have been consistently successful, giving high production rates, low power consumption and good quality pulp.

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In the States somewhat finer gritted stones have been used. In the Great Northern grinder with the higher unit pressures common to this type of grinder, fine grit combinations shading to the hard side are finding favor. The finer grit gives a news pulp somewhat more suited to domestic requirements and the harder grades keep stone wear to a minimum. It is interesting to note in passing that in an emergency and for a short period of time, in excess of fifty tons per day has been produced from a single stone under the tremendous load of better than 2,000 hp.

This is an interesting commentary on the strength and producing ability of the stone but it is not recommended as regular practice.

Sharpening schedules vary from 50 to 150 hours depending on type of pulp and grinding conditions.

TISSUE: Again the uniformity of pulp produced makes the Norton stone an asset for tissue stock, where even fibered pulp is required for light weight sheets. Freeness varies from 60 to 100 cc. Medium to fine grit stones of normal hardness have been used, producing a long fibered stock at a good production rate for the low freeness. Moderate burring once or twice a week, is the usual burring cycle.

ROTOGRAVURE: A fine fibered stock free of waste is essential to this class of paper. Fine gritted stones of special combinations have been used with marked success. Freeness, 50 to 80 ccs., have been held with the stock exceptionally free of wood waste which is detrimental to a highly calendered sheet.

It has been our experience that high quality pulp is better maintained on any given stone by judicious use of the burr rather than the use of a particular type of burr. Obviously there is a limit to this statement. Coarse burrs are ordinarily used for relatively coarse stock, and finer burrs for fine stock, but even at that a considerable range of stock quality can be obtained with a single burr. For instance, take an average type of burr, say a 10 cut 1¼ inch lead spiral. By manipulation along the lines given in the following table both slow and free stocks can be made.

Type of Pulp	Burr practice
Free short fiber	Medium, every 24-48 hours
Free long fiber	Medium-hard, once a week
Slow short fiber	Light, every 24-48 hours
Slow long fiber	Moderate, once a week

Stone characteristics would need consideration in applying such a schedule. A coarse stone would have difficulty in maintaining a slow stock and likewise a fine gritted stone would not be suited to the continuous production of free stock without undue manipulation.

We have found it very desirable to make artificial stones of medium hardness to limit stone wear, but not so hard as to make burring a difficult task. Flexibility of manipulation is essential. It is best maintained by making the stone surface receptive to any intensity of burring necessary. If the stone is too hard this is difficult to attain and the flexibility of operation is thereby lessened.

The question has been raised as to the relative merits of the Alundum (aluminum oxide) or Crystolon (silicon carbide) type of abrasive for use in pulpstones. It is our studied opinion that Crystolon or Silicon carbide abrasive is the more desirable to meet the conditions ordinarily imposed on pulpstones.

Crystolon resists more readily wide and rapid changes in temperature. Its coefficient of expansion is 50 per cent less than that of Alundum so that intensity of stresses on adjoining segments due to heat developed during grinding is not as great. Crystolon grain fractures more easily so that the burring of the stone face is more readily accomplished with considerably less harshness of action.

We feel, therefore, that Crystolon provides a more flexible stone, one that meets unusual heat strains to better advantage. It responds more satisfactorily to the application of the burr thereby making it easier to produce high quality pulp of any desired grade.

New Developments

We have, for the past year or so, experimented with a new joint material. While it is in some respects still in the development stage, an improved joint material has been produced and used with great satisfaction. It wears away flush with the abrasive and allows a very uniform burr pattern. It resists the corrosive and erosive effects of the grinding process to marked advantage. We have deliberately proceeded with caution, feeling that a new development such as this should be thoroughly tested in a number of mill installations for a period long enough to definitely establish its superior performance.

Stone of Lower Initial Cost

We have spent no little time in development work on a stone of lower initial cost. Naturally, to maintain the high standard of performance that Norton Company has considered essential to any of its products, it has been considered advisable to reduce the quantity of usable abrasive rather than lower the quality of any of the materials that are used in its fabrication.

We have designed such a stone in which the amount of available abrasive has been reduced about 35 per cent with a comparable reduction in price. The type of abrasive, joint material and abrasive specifications are identical to those in the standard stones, so that the quality of product is in no way affected. This type of stone is still in process of development, although we have a number placed in various mills undergoing test under mill conditions. The results so far obtained are more than satisfactory.

It is not our intention to have this type replace our present standard pulpstone. We hope, rather, to expand the application of the artificial stone to meet special circumstances wherein a stone of reduced available abrasive might serve a mill to better advantage.

We hope that shortly we may be able to present these new developments to the industry with the knowledge that they have withstood exhaustive tests under continuous mill operation.

Valuable Asset of Control

The artificial stone has taken a very definite place as a valuable asset of control in a ground wood mill. Norton stones have clearly demonstrated a superior performance so that they are rapidly becoming standard equipment in many progressive mills.

We are not satisfied, however, to stand still and rest on our laurels no matter how hard won. We are constantly reaching forward endeavoring to produce superior products. To better understand the fundamentals and to establish grinding performance of artificial stones in numerical terms, we are embarking on a comprehensive program of research and development. We do not propose a test of limited duration but rather one that will take months to complete.

Out of the wealth of data that will be forthcoming we shall be able to place at the disposal of the industry reliable and authentic information on the ground wood process and on the grinding performance of artificial stones.

Waste Utilization and the Reduction of Steam Polution*

By L. F. Warrick[1] and J. M. Holderby[2]

Utilization of wastes and reduction of waterways pollution are happily inseparable in large part in the Pulp and Paper Industry. This fact is being increasingly demonstrated. More and more mills are converting former wastes into better yields, with measurable decreases in the pollution loadings on streams. Problems involved, however, challenge the abilities of both technical personnel and mill superintendents. Methods are being developed by engineers, chemists and others concerned, but it is essential to devise and maintain satisfactory operation procedures if continuously effective and economical results are to be obtained from both the waste utilization and pollution abatement points of view. In many cases where wastes are now being successfully recovered or treated to remove fiber and chemical substances of a pollutional nature, a considerable measure of credit must be extended to mill superintendents for profits realized and stream improvement accomplished.

Consider the increasing public interest in clean streams. Why is there the need to give the question of pollution serious consideration? Closer contact with harmful effects of excessive pollution has aroused many persons and groups to protest and insist that remedial action be taken by those responsible for the pollution. The uses of natural waters for drinking and domestic purposes; for industrial water supply; for watering of stock; for propagation of fish, oysters, and other aquatic life; for navigation; for power production; for agricultural development involving irrigation; and for recreational purposes, including bathing, boating and fishing, particularly for game fish—all these uses have been adversely affected in some degree by utilizing the same waters for the disposal of sewage and industrial wastes. In some cases streams have been so polluted as to make them absolutely unfit for normal uses. The result has been a growing demand, particularly during the past fifteen years, that our natural waters be kept in a reasonably clean condition.

That pollution of waterways has during the recent years come to be recognized as a serious problem of national and even international scope is evidenced by the formation and functioning of various governmental boards and commissions charged with the investigation of the problem and working out corrective measures. Approximately three-fourths of the states in the Union, including practically all of the states in which pulp and paper is manufactured, have enacted some type of pollution control legislation and many have created a State Committee on Water Pollution or its equivalent. Nationally the pollution problem is being considered by the recently created National Resources Committee as well as by the other older agencies. Congress has been giving consideration to federal legislation on the subject, with at least eleven bills having been proposed at the last session.

Experience has shown that law enforcement alone does not provide the solution of many problems of pollution by industrial wastes. There are technical and economic, as well as legal aspects to be considered. Accordingly the trend, particularly during the past decade, has been toward the establishment of governmental, industrial and other agencies to undertake cooperative studies, to work out suitable means of reducing these wastes to a minimum, and to bring about the necessary stream improvement.

General Policy

The general policy underlying the various programs adopted by a number of these agencies through which some very satisfactory results are being obtained calls for: *(1)* waste utilization to the greatest possible degree, and *(2)* if a pollution problem still exists, installation of any effective and practical method available or capable of being developed to treat and dispose of the wastes in a satisfactory manner. With certain wastes, such as those produced in pulp and paper mills and in corn products plants, it has been found that by carrying waste utilization to its economic limits, pollution problems may be entirely eliminated or greatly minimized. It has been found in a number of cases that the value of the materials recovered far exceeds the cost of installation and operation of the recovery systems. Progress made in the past few years substantiates the truth of the adage, "From the wastes of today will come the profits of tomorrow."

Wisconsin Program

Since 1925, the Wisconsin Board of Health has been carrying on a program to reduce pollution caused by sewage and industrial wastes, and accordingly considerable attention has been given waste problems confronting the Pulp and Paper Industry. Studies to obtain data for determining the fiber content and the pollutional value of wastes from each mill and for evaluating improvements in mill equipment and operation have been carried out in 1925, 1929, 1931, and each year thereafter, *(1) (2) (3) (4) (5)*. Procedures in carrying out these studies are described below.

Mill Waste Surveys

At each mill conferences were held with officials, objectives were pointed out, results of previous studies were discussed and arrangements were made for the collection of the desired samples and flow data.

Surveys made prior to 1933 were based on sampling periods of 24 hours or less. Since 1933, however, sample and flow data collection has been over periods of one complete week's operation.

Samples were taken and flow measurements were made at intervals of from 2 minutes to 2 hours, according to the nature of the waste. Wastes which were relatively constant as regard solids content were sampled without regard to quantity of flow at time of collection. Others were "weighted" according to discharge.

Weirs were used in most cases for the estimation of flows. In sewers inaccessible or unsuitable for weir installation flows were estimated from current meter measurements, Pitot tube traverses, or consistency determinations.

Composite samples were shipped to the State Laboratory of Hygiene, where determinations were made for total and suspended solids, both fixed and volatile; pH, oxygen consumed and 5 day biochemical oxygen demand. An-

* Presented at the annual meeting of the American Pulp and Paper Mill Superintendents Association, Grand Rapids, Mich., June 24-26, 1936.
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alytical methods conformed to standards of the Technical Association of the Pulp and Paper Industry and the American Public Health Association. Interpretation of analytical results have been discussed in previous published reports. *(2) (3).*

Individual reports with recommendations and charts summarizing the data collected have been sent each year to each mill concerned.

Waste Survey Results

Observed waste flows, fiber losses and pollution equivalents from the 1931-2-3-4 and 5 studies are shown in Table I. Included in this table are only those mills for which reasonably reliable data are available, and at which survey procedures have varied little over the five year period.

The pollution or population equivalents here shown indicate the number of persons who, by the production of normal domestic sewage, would exert an oxygen demand on the stream equivalent to that of the wastes from the manufacture of one bone dry ton of the mill product. To arrive at these equivalents, the 5 day oxygen demand of the waste in question, expressed in pounds per ton of product, is multiplied by 6.0.

As regards the precision of the data obtained; each year attempts are made to introduce refinements in the survey procedure at every mill, and accordingly it is believed the data collected is each year progressively more reliable. In but few instances has trouble been experienced in obtaining at least a fair degree of cooperation from mill officials.

Discussion of Results

A study of Table I reveals that for the entire group of 39 mills, unit waste flows and fiber losses decreased steadily from 1931 to 1933 and that while they increased somewhat in 1934 they decreased again in 1935 to values somewhat lower than the previous minimum. The same is noted to be true for all the individual classifications except the sulphite mills, in which group values were found to be somewhat lower than in 1934 but definitely higher than in 1933 or 1932.

To indicate specifically the magnitude and value of the fiber losses from the mills included in Table I, actual weights of fiber lost from individual mills at average production have been calculated and evaluated in dollars and cents according to the previously reported schedule of values *(5)*. From the summations of these calculations, which are shown at the foot of Table I, it may be seen that, whereas in 1931 this group of mills were sending to the streams of the state some 107.6 tons of fiber worth $4,043.41, they were in 1935 wasting daily 55.4 tons worth

TABLE I

PULP AND PAPER MILL WASTE STUDIES COMPARISON OF RESULTS FROM IDENTICAL MILLS 1931-1935

	Waste Flow M. Gallons Per Ton					Fiber Loss to Sewer Per cent of Production					Population Equivalent Persons Per Ton			
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931	1935	1934	1932	1931
PAPER MILLS (PAPER ONLY)														
1	22.0	14.4	22.2	17.4	18.5	1.5	1.4	0.7	0.5	2.9	27.6	21.6	8.4	31.1
2	10.9	22.1	15.5	4.3	33.2	0.9	1.0	2.4	0.3	2.1	14.4	26.4	3.1	41.1
3	109.8	83.1	93.9	100.2	116.7	4.5	5.1	3.3	2.6	6.3	52.8	63.0	26.9	79.0
4	36.7	39.9	26.8	55.5	48.4	1.6	4.0	0.4	5.7	5.2	39.6	40.8	79.7	37.7
5	12.6	12.5	16.3	1.3	1.3	0.3	0.8	1.1	0.02	0.01	14.4	16.2	0.5	0.9
6	6.7	10.6	12.9	8.7	13.3	0.4	0.6	0.22	0.45	0.6	3.0	2.4	3.1	3.6
7	21.3	18.2	43.4	23.6	23.4	0.8	0.9	1.1	0.8	1.4	16.8	8.4	7.2	9.6
8	15.5	27.0	25.1	19.6	30.4	1.2	2.6	2.0	1.5	2.3	3.6	11.4	17.6	25.8
9	7.7	4.7	5.6	29.9	21.1	0.9	0.8	0.3	6.0	3.5	4.8	4.8	26.9	13.2
10	57.6	67.4	112.6	102.0	102.4	0.5	0.9	1.8	2.7	2.7	27.6	76.8	36.7	116.8
11	12.2	10.2	15.1	22.7	8.2	0.9	0.9	1.9	3.1	1.3	11.4	7.2	39.0	3.2
12	39.2	38.4	28.1	20.8	27.5	9.3	10.8	4.6	2.6	3.5	21.0	13.8	14.1	11.4
13	4.9	14.0	22.9	69.8	82.9	0.7	4.5	1.1	9.5	5.3	3.0	6.0	100.9	59.9
14	17.1	27.2	22.2	19.5	17.9	1.2	4.3	1.2	2.2	2.6	18.6	19.2	29.2	51.5
15	33.8	26.4	3.1	35.9	39.2	3.2	0.4	0.02	2.1	3.0	36.0	15.6	6.6	18.6
16	38.8	48.0	70.4	85.1	53.4	1.3	1.9	0.5	2.2	4.3	63.6	16.8	35.7	5.4
17	29.7	37.8	27.8	18.8	11.7	2.4	4.8	3.6	4.1	2.8	11.4	26.4	28.7	10.8
18	15.6	14.7	20.4	8.5	19.6	1.7	3.5	4.9	1.3	3.9	13.8	10.8	21.9	50.9
19	25.9	43.9	35.2	22.7	35.7	2.9	7.5	3.6	1.5	4.2	21.6	45.6	17.2	48.5
20	8.8	42.7	20.7	17.1	17.1	1.1	1.8	0.6	0.5	1.1	14.4	54.0	20.4	7.2
21	49.7	50.7	67.5	60.5	64.7	1.5	2.2	4.3	5.9	6.7	74.4	158.4	155.5	58.1
AVE. ..	27.5	32.9	33.7	35.4	37.5	1.8	2.9	1.9	2.6	3.1	23.5	30.7	32.3	32.6
SULPHITE MILLS (PULP ONLY)														
1	59.9	87.7	85.7	73.4	50.1	1.7	5.3	7.2	4.5	14.4	1198	1200	1322	926
2	53.8	104.3	67.3	70.4	71.5	3.2	4.7	2.4	6.5	2.5	574	1079	1468	1382
3	67.8	48.2	55.8	23.2	64.3	1.8	1.3	1.0	2.4	9.9	1334	1483	1227	2290
4	49.9	54.2	42.2	36.0	35.9	6.4	2.6	2.2	1.4	1.8	1266	1905	1157	1255
5	103.3	47.7	52.6	48.0	49.1	3.2	3.1	1.3	1.1	11.2	535	1648	1480	2772
6	90.6	73.4	65.1	59.2	117.8	6.2	5.0	2.5	2.3	17.8	771	1703	1483	6763
7	33.5	20.9	23.1	13.4	36.9	1.3	1.2	0.9	1.8	3.2	1393	1153	2560	1903
8	54.5	67.5	54.3	57.3	80.0	3.7	2.3	2.6	4.5	16.1	392	1667	1259	2064
9	51.2	43.5	30.9	87.5	120.6	0.8	1.6	1.5	2.2	5.5	1072	1702	1953	1844
10	67.6	95.1	98.3	161.0	225.6	1.7	8.8	2.7	3.9	25.4	1672	1871	698	2057
AVE. ..	63.2	64.2	57.5	62.9	85.2	3.0	3.6	2.4	3.1	10.8	1021	1541	1461	2326
GROUNDWOOD MILLS (PULP ONLY)														
1	3.7	13.8	8.6	23.4	7.1	1.3	4.0	1.7	8.1	1.7	3.6	21.0	79.1	6.6
2	12.3	33.2	42.4	3.5	28.1	1.3	2.9	3.1	0.6	1.3	12.0	...	9.0	23.4
3	NIL	0.4	1.5	22.8	27.0	NIL	0.1	0.2	2.5	1.5	NIL	0.6	40.8	32.3
AVE. ..	5.3	15.8	17.5	16.6	20.7	0.9	2.3	1.7	3.7	1.5	5.2	10.8	43.0	20.8
MISCELLANEOUS MILLS (PULP OR PAPER OR BOTH)														
1	18.1	26.6	21.9	22.5	25.6	2.8	4.2	3.4	2.6	2.5	18.0	16.8	31.2	19.2
2	14.8	14.1	13.3	15.5	19.8	2.2	2.2	1.9	4.1	3.9	10.8	12.6	17.7	15.0
3	21.5	27.2	28.4	33.7	38.2	2.0	1.9	2.8	2.5	4.7	55.2	83.4	51.6	53.9
4	15.5	18.6	18.3	30.0	25.9	3.8	0.5	9.6	5.1	10.5	31.8	18.6	50.3	38.9
5	34.4	33.9	55.2	37.8	37.3	2.5	3.1	2.8	1.5	3.1	84.6	97.8	96.0	213.6
AVE. ..	20.9	24.8	27.4	27.9	29.4	2.7	2.4	4.1	3.2	4.9	40.1	45.8	49.3	68.1
GRAND AVE.														
39	34.1	38.5	37.8	40.1	47.4	2.2	3.0	2.3	2.9	5.2	279.9	429.0	401.6	624.2

	1935	1934	1933	1932	1931
Daily Total Fiber Loss From Above Group (Tons).....	55.4	69.7	51.3	60.1	107.6
Daily Total Value of Fiber Lost.....	$2051.90	$2576.06	$1879.09	$2113.80	$4043.41

TABLE II
DISTRIBUTION OF PAPER & SULPHITE MILLS ON BASIS OF FIBER LOSS & WASTE FLOW—1934

Fiber Loss			Waste Flow/Ton		
Range of Loss	No. Mills	Per cent	Range of Volume	No. Mills	Per cent
PAPER MILLS					
0.0%—1.0%	10	32.2	0 Gal.— 20,000 Gal.	14	45.2
1.1%—2.0%	11	35.4	20,001— 40,000	11	35.4
2.1%—3.0%	4	12.9	40,001— 60,000	3	9.7
3.1%—4.0%	2	6.5	60,001— 80,000	0	0.0
4.1%—5.0%	2	6.5	80,001—100,000	1	3.2
5.1% and over	2	6.5	100,001 and over	2	6.5
Total	31	100.0		31	100.0
SULPHITE MILLS					
0.0%—1.0%	2	14.3	0 Gal.— 20,000 Gal.	2	14.3
1.1%—2.0%	6	42.9	20,001— 40,000	1	7.1
2.1%—3.0%	1	7.1	40,001— 60,000	5	35.8
3.1%—4.0%	3	21.4	60,001— 80,000	3	21.4
4.1%—5.0%	0	0.0	80,001—100,000	2	14.3
5.1 and over	2	14.3	100,001 and over	1	7.1
Total	14	100.0		14	100.0

$2,051.90. Inasmuch as the group included in Table II constitute only about two-thirds of the mills in the state, the total losses from the industry in the state are materially in excess of the above.

Population equivalents are noted to have decreased to new lows in all groups, although the large decrease shown for the sulphite group is open to some question on account of the abnormally low values found for mills numbered 2, 5, 6, and 8. As pointed out previously, the majority of the pollutional strength of sulphite pulp wastes is due to dissolved rather than suspended material and is largely concentrated in the waste cooking liquor. While it is possible that improvements in cooking methods may have been made at some mills, whereby decreased amounts of easily oxidizable sulphur and other compounds are being discharged with the waste liquor, it is not believed probable that such improvements have been so radical as to explain the low pollution equivalents found for the four mills in question.

Noteworthy in the paper mill group is the large number of mills whose fiber losses are below 2 per cent and, in all groups, the wide variations between the high mills and the low ones.

The distribution of the paper and the sulphite mills with regard to magnitude of fiber loss and unit waste flow is shown in Table II. Here it is to be seen that 21 out of the 31 paper mills studied have fiber losses of 2 per cent or less and that the losses from 10 mills are 1 per cent or less. This represents a gratifying change from 1931 when only 5 paper mills out of 23 were below 2 per cent fiber loss. Similarly we find 8 sulphite mills out of 14 with fiber losses of 2 per cent or less. In 1931 there were found only 3 out of 12 mills in this class with losses of this magnitude.

Corresponding trends are demonstrated with regard to unit waste flows, though the over all improvement in this respect is not quite so marked as in the case with the fiber loss.

While a great deal of improvement as regards waste conditions has been noted for certain individual mills and for the Wisconsin Industry as a whole, the great difference between the low figures or even the averages and the maxima in the various classifications is ample evidence that there yet remains quite a bit of progress to be made. Frequently mill men claim that it is hopeless to expect all mills to reduce their losses to the same level; pointing out that some papers and some operations, such as for instance bleaching, most of necessity use more water

FIG. 1
Pulp and Paper Mills in the Fox River Valley where a comprehensive waste utilization and stream improvement program is now in progress.

and lose more fiber than others. While there is undoubtedly some basis for such a stand, experience has indicated that this claim is over-emphasized. In most grades and for most combinations of operations there are in the state one or more mills in the low fiber loss group furnishing examples for similar mills whose losses are high.

In this connection it is of interest to take note of the data contained in Table III which is based on all the straight paper mills included in the 1935 studies and compares unit waste flows and fiber losses for mills operating with and without bleaching operations. It has long been

TABLE III

UNIT WASTE FLOWS AND FIBER LOSSES FOR PAPER MILLS WITH AND WITHOUT BLEACH WASTES. 1935 DATA

Type of Paper Mill	No. Mills	Waste Flow M. Gals./Ton	Fiber Loss Per cent of Prod.
Mills without bleach wastes.....	26	32.6	2.3
Mills with bleach wastes.....	5	36.0	1.8
All mills	31	33.2	2.3

the opinion of some mill operators that paper mills doing their own bleaching could not be expected to maintain losses at so low a figure as a similar mill in which no bleaching was carried out. The data presented in Table III would seem to furnish a rather conclusive basis to refute this opinion.

Chemical Pulp Wastes

A major pollution problem is occasioned by waste liquors from chemical pulp mills. These wastes have been reported to seriously interfere with coagulation processes in municipal water purification plants when present in very small amounts in the source of supply. Failure to remove substances in the wastes by normal purification processes has been given as the cause of certain objectionable tastes and odors reported by water consumers. Numerous other complaints have been made concerning the results of pollution by these strong wastes.

The most common complaint in Wisconsin relates to the effect of chemical pulp wastes on fish, and resulting damage to recreational and conservation interests. Studies have accordingly been conducted to obtain definite information on this phase of the mill waste problem. Results of these studies are reported by Cole *(6)*. In brief, results obtained by Cole indicate that the primary effect of sulphite and sulphate waste liquors on fish life is through removal of the dissolved oxygen from the water. While it was found that direct toxic effects on the game fish used in the experiments occur with both wastes in high concentrations such concentrations would not be expected in streams below pulp mills in Wisconsin, except possibly in the immediate vicinity of sewer outlets. Fish died in short periods in 1 to 50 dilutions of sulphite waste liquor, but many survived the duration of the experiment (28 days) in a dilution of 1 to 200 without any serious ill effects. While dilutions of 1 to 500 of sulphate waste liquor were irritating to fish, definite toxic effects occurred mainly in dilutions of 1 to 200 or less. Death of fish is attributed to respiratory paralysis, caused in part presumably by mercaptans or sulphur compounds *(7)*. Since these sulphite and sulphate wastes would probably deplete the dissolved oxygen in a stream below the critical amount necessary to sustain fish life before the above limiting dilutions for toxic effects are encountered, the most significant characteristic from the pollution point of view is their oxygen demand. Our present knowledge does not permit any statement concerning their relative effects on fish foods and reproduction of the species.

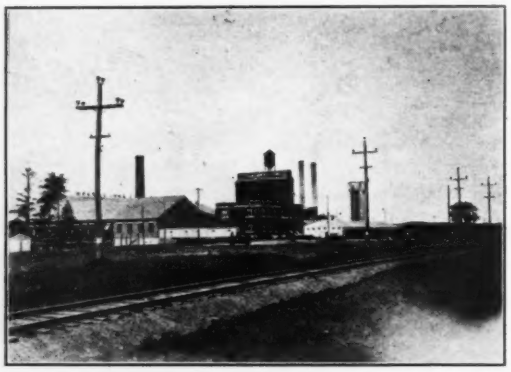

FIG. 2
Installation of a plant for utilization of sulphite waste liquor has recently been completed at this Wisconsin mill.

FIG. 3
Pulp and Paper Mill Chemist Making dissolved oxygen tests in the cooperative stream survey activities in Wisconsin.

Oxygen demands of these wastes were reduced by aeration, observations indicating that the toxicity of the sulphate liquor was also reduced. The toxicity of the effluent from the Howard recovery process proposed for sulphite waste liquor was but slightly reduced as compared to the raw liquor, even though studies have indicated that a very substantial reduction in oxygen demand could be accomplished by the process. Ozone treatment of the wastes did not accomplish expected improvements, and from the results obtained and other considerations it appears that the process is of limited value in connection with securing practical solutions of pollution problems occasioned by sulphite and sulphate waste liquors.

In a preliminary report by Howard *(8)* on pilot plant tests of his method of treatment of waste sulphite liquor by fractional precipitation with lime, it was pointed out that oxygen demand tests on the final effluent indicated a reduction of at least 75 per cent as compared with the untreated liquor. This means that the process should remove over three-fourths of the pollution loading of a body of water based on oxygen requirements of the sulphite waste liquor.

From these tests it was concluded: "(1) that the process is commercially feasible to install and operate; (2) that the value, under Wisconsin conditions, of the recovered products for making fresh cooking acid and for a boiler fuel will carry the process and show them net profit, and (3) that the tail liquor effluent has much less oxygen demand than the untreated liquors and probably less toxicity."

Sulphite Waste Recovery

Progress is now being made with the Howard process for utilization sulphite liquor through the operation of a

full-scale installation at a Wisconsin mill. It is anticipated that this plant will provide a definite answer to the question of whether the process can practically and economically solve the sulphite waste liquor problem in this state.

The Paulson process for utilization of sulphite waste liquor has been given careful study in recent years. It has been described in considerable detail in the literature *(9)*. This is essentially a multi-stage evaporation process as distinguished from the fractional precipitation of the inorganic and organic components of sulphite waste liquor by lime treatment in the Howard Process. It is understood that recent developments indicate that savings substantially larger than those reported by Kimball *(9)* can now be effected by the Paulson process. Unquestionably installation of a demonstration plant using this process will aid in providing essential information as to the best procedure to be followed in minimizing gross pollution occasioned by sulphite waste liquor.

Sulphate Mill Wastes

Spent cooking liquors from soda and sulphate or "Kraft" pulp manufacture are not, from the stream pollution point of view, materially unlike those produced in the manufacture of sulphite pulp. The pollution problems presented by all three types are essentially the same due to the high oxygen demand of their unstable components, and their solutions depend entirely upon their efficient treatment or recovery.

In the soda and sulphate fields recovery plants are necessary for economic reasons and are, therefore, universally used. In spite of this, however, pollution from mills of these types is often rather severe, due to inefficient operation of the recovery units, and, in some cases, to the economical degree of recovery being somewhat less than enough to protect the receiving stream. Results from these studies indicate a variation in the pollutional strength of Kraft wastes of from a population equivalent of 50 to one of 1,000. It is to be assumed that a mill whose waste strength would be represented by the lower figure is doing a much more efficient and thorough job of chemical recovery than one whose wastes approach the upper figure.

Conclusion

In conclusion it may be stated that the studies here reported confirm in a large measure the belief that paper and wood pulp mills generally can be reasonably expected to reduce their fiber losses to 1 per cent or less of their production.

Regarding recent developments in waste sulphite liquor recovery processes it would seem probable that in the not distant future public sentiment will demand the elimination of this highly pollutional waste in its raw state from our water courses.

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Grinding Pulp with Laboratory Assistance*

By George K. Walker[1]

During the last year since I presented a paper on grinding pulp, at our last meeting at Richmond, we have installed a small laboratory in our mill and we have learned many things about grinding pulp that we did not know before.

Since installing our laboratory in October, 1935, we have tried to measure the results of all of our variables that enter into the grinding of pulp that pertain to our particular mill, and in doing so we have accumulated a lot of data in the form of curves and charts which I believe will be more interesting to you than anything I could tell you about making ground wood pulp.

When I prepared a paper on this subject last year we had only a blue glass and freeness tester in the pulp mill to guide the operations in controlling the quality of the pulp, and now we believe that all we knew about the pulp at

* Presented at the annual meeting of the American Pulp and Paper Mill Superintendents Association, Grand Rapids, Mich., June 24-26, 1936.
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TABLE I

TABLE SHOWING REDUCTION OF SPREAD, BEFORE AND AFTER BURRING, FOR A PERIOD OF SIX MONTHS.

October	November	December	January	February	March
12.2-6.4	11.4-10.0	12.7-10.4	11.5-10.7	11.4- 9.2	12.0-11.3
11.7-7.2	8.6- 8.0	13.9-10.1	10.8- 7.5	12.5-11.3	11.8- 7.8
10.5-6.2	9.3- 8.8	11.0- 9.6	10.7-10.5	13.3-10.8	10.8- 9.8
7.4-7.0	11.3- 9.7	10.4- 7.7	10.9- 7.6	11.0- 9.5	11.4-10.3
10.5-8.7	12.0- 9.4	11.1- 8.3	11.6-11.2	11.5- 7.3	11.5-11.4
10.5-7.1	10.7- 7.7	12.3-11.1	11.1- 8.9	10.9- 7.6	11.5-10.2
	9.9- 9.4	10.5-10.1	13.3- 7.8	10.5- 9.0	11.8-10.5
	10.5- 6.7	10.4-10.3	10.1- 8.5	11.1- 9.9	10.2- 9.3
	11.6- 7.0	12.8- 7.7	11.8- 8.6	11.2- 9.5	11.4-10.1
	12.0- 9.9	12.0-11.5	11.4-10.2	11.0- 8.8	
	12.1-11.8	11.8- 7.9	12.0-11.8	12.0- 9.6	
	11.9- 6.7	11.3-10.3	11.9-11.3	11.9-10.7	
	11.4- 8.1	11.8- 8.7	9.1- 7.4	12.3-11.0	
	10.1- 8.3	11.7- 9.4	10.8- 7.0	10.0- 9.0	
	11.9- 6.7	11.7-11.4	11.2- 9.2	9.1- 8.7	
	11.2- 6.7	10.2- 7.3		11.3- 9.5	
	11.0- 8.4	9.6- 5.9			
		11.3- 8.1			
		11.8- 8.7			
		7.4- 6.5			
		11.3- 9.0			
		AVERAGE SPREAD			
3.4	2.6	2.3	2.0	1.8	1.3

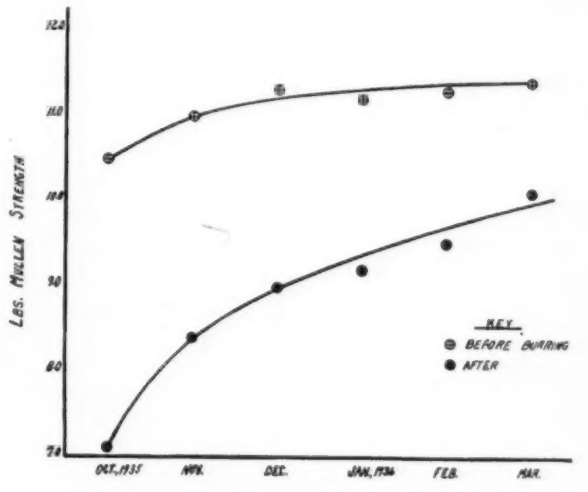

FIG. 1
Progress curves for six months period showing reduction of average spread before and after burring.

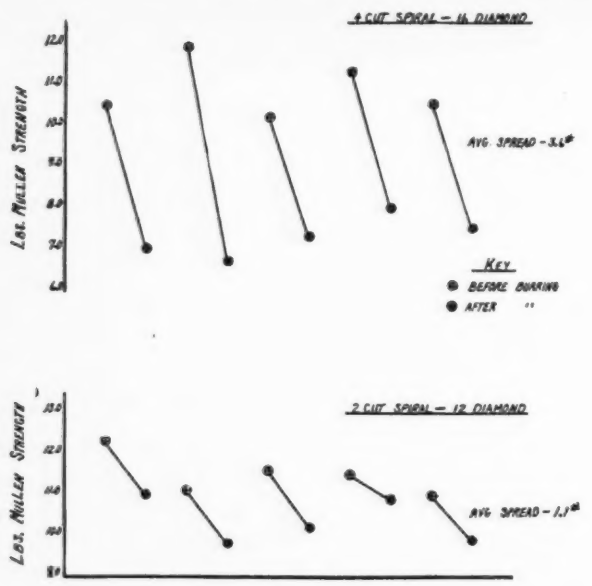

FIG. 2
Stone 5A—50 grit Norton. Reduction of average spread, before and after burring, due to change of burrs.

that time was, that the freeness was what we desired and we judged the strength of the pulp by how it looked on the blue glass, but that was only a guess.

The first and most important piece of equipment we installed in our laboratory was a sheet making mould and a motor driven Mullen tester, and the data which I am submitting in connection with this paper shows conclusively that from the day we began using the sheet making mould and the Mullen Tester last October, we have been able to increase the strength of our pulp by a little different method of burring our stones and, in some cases, by changing the burrs.

Table I shows the tests as made at the individual stones before and after sharpening; in November, there was a

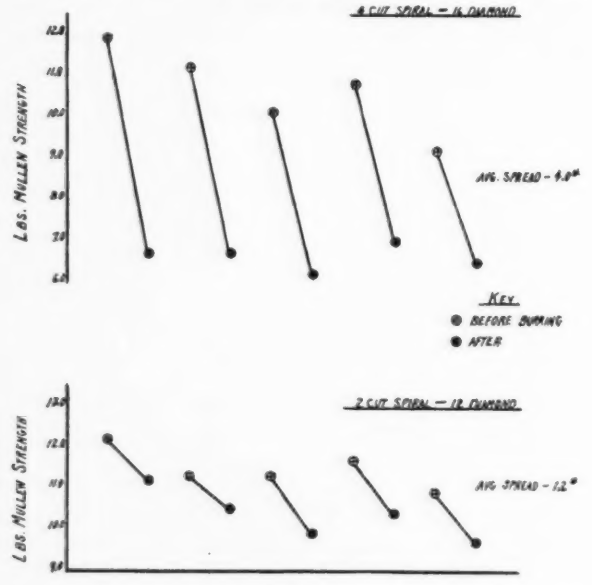

FIG. 3
Stone 5B—50 grit Norton. Reduction of average spread, before and after burring, due to change of burrs.

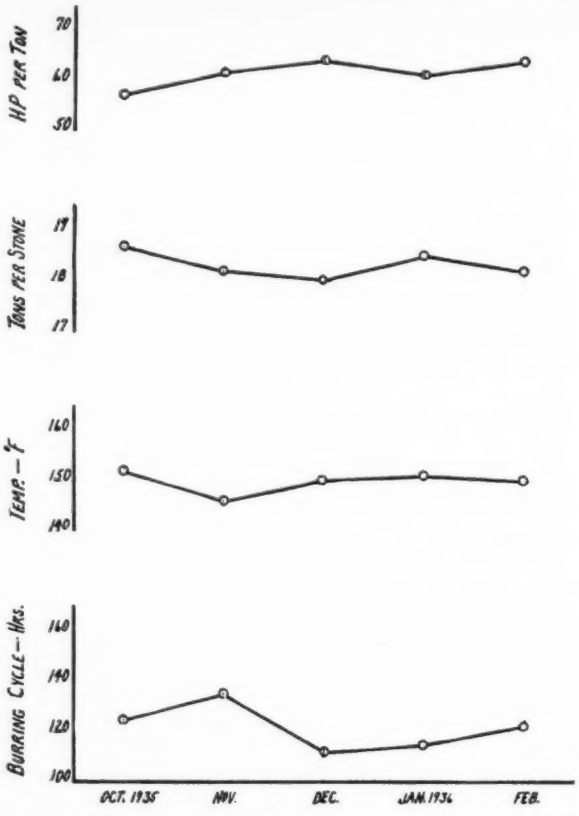

FIG. 4
Grinding data for five months period.

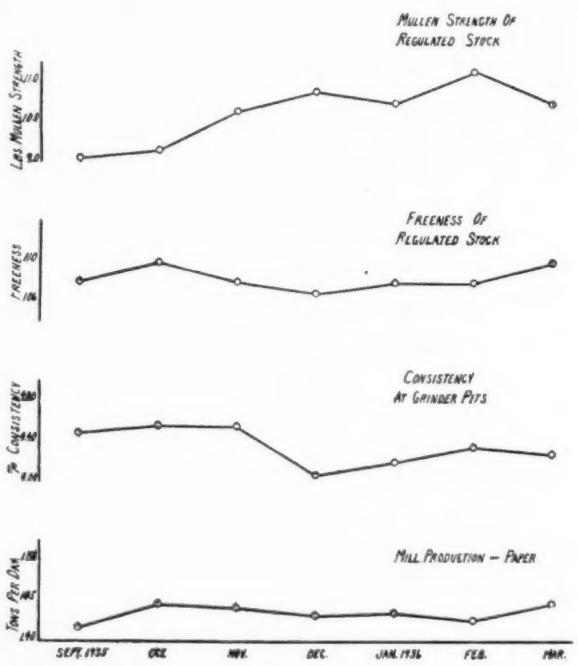

FIG. 5
Miscellaneous curves for seven months period.

spread of 2.6 pounds, in December, 2.3 pounds, in January, 2.0 pounds, in February 1.8 pounds and in March 1.3 pounds. This is illustrated in Fig. 1.

Fig. 2 shows the results obtained by changing burrs. You will note the upper curve shows the results which we were getting with a No. 4 straight cut and a No. 16 diamond cut burr, a low Mullen of 6.2 and a high of 11.9 with a spread of 4 pounds. The lower curve shows the results from changing to a No. 2 cut spiral and a No. 12 diamond. Here we have a low of 9.6 and a high of 12.2, a spread of 1.2.

Fig. 3 shows very similar results by the same change of burrs on another stone.

Fig. 4 shows the horse power per ton, temperature at the grinder pits and burring cycle, and tons per stone.

Fig. 5 shows the strength of our deckered stock as going to the mixer. You will notice that this curve nearly follows the tests as made at the stones, a gradual increase for seven months. The freeness curve was very uniform, the paper production varied only a few tons per day during this seven months period.

Fig. 6 shows a slight but gradual reduction in our sulphite furnish and the paper strength increased slightly as we decreased the sulphite and increased the strength of our ground wood pulp.

Fig. 7 shows that as we decreased sulphite and improved the ground wood pulp, the Bekk smoothness improved.

From this data, and much more at the mill which I did not include in this paper, I feel that we have made more progress in improving the quality of our ground wood pulp during the last six months than we had in the previous eighteen years, and we believe there is still room for improvement along this line. After using a sheet making mould for six months, I am ready to say we believe it is one of the most important requirements in making good ground wood pulp, as it enables the operator to know just how strong the pulp is on each individual stone at any time before or after sharpening, changing temperature or consistency.

We are still just as happy with our Great Northern grinders as ever; some of these grinders have been in operation for over two years and the others nearly two years, and so far we have changed only one stone, and this because of a loosened segment, which was replaced

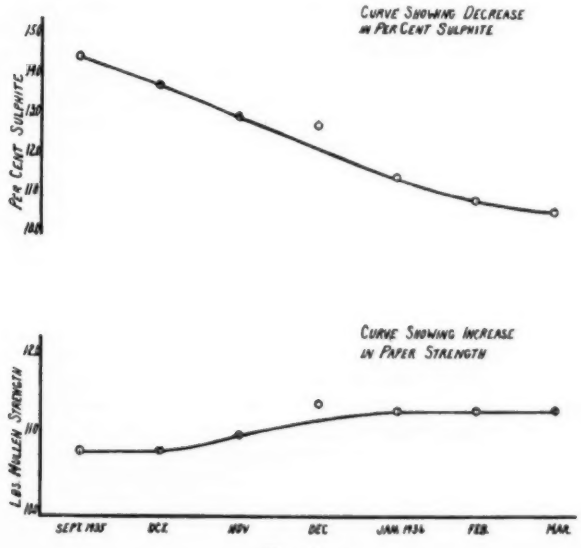

Fig. 6

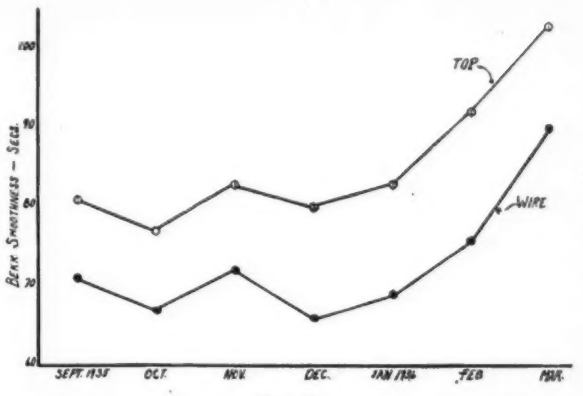

Fig. 7

No. 3 Machine—progress curves for seven months period, average daily tests.

by the maker. At the present time our stone cost is about six cents per ton actual measurement each month, and our tailings average about 2 per cent. These are refined in a Haug refiner using 40 hp.

In closing, I would like to suggest to any of you who think you can determine the quality and strength of ground wood pulp with a blue glass and freeness test alone, to install a sheet making mould and find out for yourself how poor a guesser you have been, and give your pulp maker a piece of equipment to help him to eliminate the guess-work. Regardless of how good the pulp is he has been making for you, he will make it a lot better and keep it more uniform. I believe it is just as essential to have this outfit in a pulp mill as it is to have calipers and micrometers in a machine shop.

I believe nearly every paper mill relies largely on a Mullen tester to measure the strength of the paper they manufacture, and I consider it to be just as essential to know the strength of the pulp, as the pulp controls considerably the strength of the paper. We gave our pulp makers the equipment to work with and I can see that they have increased the strength of the pulp each month since starting.

There is no reason why other pulp makers should not be able to do the same as our men have done.

Dorr Co. Consolidates in New York

With the moving of its main office in New York city from the Park-Lexington Building to the General Electric Building, 570 Lexington Ave., at 51st street, on July 1, the Dorr Company will complete the transfer of all major functions, including engineering, to the East.

Hereafter, the engineering department, in charge of design and manufacture, will be permanently located in New York, completing the move from old headquarters in Denver begun several years ago. Research and development will continue to be handled at the Westport Mill, Westport, Conn., as has been the case for the last nineteen years.

The new Dorr executive and sales offices will occupy the entire ninth floor of the General Electric Building, connecting with the Engineering Department and drafting room, occupying half of the floor below.

An important feature of the new quarters is to be a large reference library, open to clients and friends, and an exhibit of new scale working models of Dorr equipment, including a replica in miniature of the initial Dorr Classifier invented and developed at Mr. Dorr's gold mill in South Dakota in 1904.

New Developments in Bleaching Sulphite*

T. A. Pascoe, R. P. Hella, and J. W. Stevens[1]

In order to expedite the discussion of bleaching in general, it would perhaps be well to clearly set forth the primary object of bleaching pulps. The bleaching operation is, of course, essentially the completion of the cooking operation, when the cooking operation is considered in the general sense of serving as a means of removing the dark-colored non-fibrous materials which are associated in the wood with the cellulose fiber. It is common knowledge that the ultimate in cooking never quite results in a pulp that will serve the purpose of a highly bleached sulphite. It is for this finishing touch, then, that the bleaching operation in some form is carried out subsequent to the cooking.

It is proposed to briefly discuss some of the more recent advances in bleaching practice and then treat in some detail the steps taken and results obtained by one mill in changing the quality of the bleached sulphite produced. If the latter phase of the subject is at all worthy of discussion, it is because the mill in question is in the position of many of the older established mills in being limited in available space, restricted by existing layout of equipment, much of which is bordering on the obsolete, and having the usual limitations on funds available for rebuilding and re-equipping an old mill. Such mills, however, have within the past few years found themselves in competition with the newer mills which turn out increasingly higher grades of bleached sulphite with the aid of very modern equipment and plant layouts suitable to use advantageously many of the new bleaching developments. In other words, this paper will deal with the steps that the average established mill can take to bring their product into favorable comparison with that of the newer mills.

The most important advance in bleaching practice since the advent of high density and two-stage hypochlorite bleaching has been that of direct chlorination. The idea of the use of chlorine directly as a bleaching agent is nearly 150 years old. The recent progress in its use has resulted from the development of suitable equipment and materials with which to practically and economically carry out the process.

The second important advance in the art has been the development of reliable and quick bleachability tests which yield results of two-fold value. First, to control cooking to give uniform pulps capable of being economically bleached; and, secondly, to guide in the actual bleaching operation.

A third development has been the adoption of multiple stage bleaching using three or four stages with interposed washing and chemical treating operations.

An additional development has been the evolution of new bleaching agents, the one showing most promise being hypochlorous acid, the so-called "buffered" bleach. This reagent is prepared by reacting chlorine water with limestone instead of quick lime. The chief merit claimed is that the bleach does not get progressively more acid as the action proceeds.

New Bleaching Agents

Of the new advances mentioned, the first two warrant further discussion. We should first briefly review the reasons for direct chlorination over hypochlorite treatment. The chief advantage of direct chlorination lies in a saving in total chlorine required to bring a given pulp to a desired color. A second advantage is that its use allows the preservation of more of the native strength of the pulp.

The reason for the saving in chlorine is related to the type of reaction that occurs in direct chlorination as contrasted to that which predominates in hypochlorite bleaching. In chlorination the encrusting materials are rendered soluble by reaction with chlorine and are subsequently removed by washing. In hypochlorite bleaching, the dark-colored substances must actually be destroyed by oxidation.

This destruction of the non-fibrous materials consumes a greater total quantity of chlorine than is the case with the solution reaction which takes place in direct chlorination. This destruction or oxidizing action which characterizes the hypochlorite bleaching is related to the second advantage mentioned; namely, the preservation of the native strength of the pulp. In the direct chlorination, the reaction of the chlorine with the lignin materials is very specific; that is, the undesirable materials are reacted with chlorine exclusively with little or no effect on the cellulose fiber. This is not true in hypochlorite bleaching for the reason that any oxidizing or similar destroying reaction is not specific. In destroying the undesirable materials, the fiber is attacked to some extent unless elaborate precautions are taken. It might be added as a third advantage that the inclusion of a direct chlorination stage in the bleaching process seems to result in higher whites in the pulp than are obtainable with an equal number of stages of hypochlorite bleaching. The reason for this is not apparent unless it is related to the actual separation of fiber and coloring material. The employment of direct chlorination entails the observance of two precautions. The preservation of the strength of the pulp was mentioned above. This was assuming normal management of the chlorinating process. Under very bad management, deterioration of the pulp can be brought about, if for any reason the pulp is allowed to stand for long periods in the acid condition. This is merely the usual degradation expected when cellulose and acid are associated under extreme conditions of temperature, time, and concentration. The other precaution necessary has to do with the carrying over of wood dirt into the finished bleached pulp. The rapidity and mildness of the reaction with chlorine results in less effective removal or bleaching of so-called wood dirt than is usually experienced with hypochlorite bleaching. For this reason the two phases of the bleaching are managed in such a manner that a substantial proportion of the total chlorine demand is supplied in the form of the secondary hypochlorite bleach. In the writer's opinion, the character of the hypochlorite bleach, whether low or high density, bears a relation to the permissible fraction of the total chlorine that should be supplied as hypochlorite. It is believed that the more vigorous action which takes place in high density hypochlorite bleaching is more effective in cleaning up dirt than would be the same amount of chlorine in a low density bleach.

For this reason, it is believed that a smaller fraction of the total chlorine can be reserved for hypochlorite if high density second stage bleaching is employed. Another important factor in cleaning up dirt in the hypochlorite stage seems to be time. With a given fraction of the total

* Presented at the annual meeting of the American Pulp and Paper Mill Superintendents Association, Grand Rapids, Mich., June 24-26, 1936.
[1] Northwest Paper Company, Cloquet, Minn.

chlorine supplied as hypochlorite, a longer period of reaction or bleaching time will result in the more complete destruction or bleaching of the dark-colored dirt particles. In the writer's experience, from 50-60 percent of the total chlorine demand may safely be supplied as direct chlorine in the first stage when a short time high density hypochlorite bleaching is employed for the second stage. The proportioning of the total chlorine between the two phases results in the maximum chlorine saving possible with the employment of direct chlorination, but does not realize the maximum preservation of strength. In the interest of clean pulp, however, the small sacrifice in strength retention is warranted.

Bleachability Test

A word should be said at this time concerning the use and advantages to be gained through the use of a quick bleachability test. Rapid bleachability tests have, of course, been known and used for a long time. Such tests all employ some drastic bleaching agent which will in a short time destroy the encrusting materials. The amount of such agent consumed is related to the quantity of bleach required by the same pulp in the normal bleaching process. Until recently, these tests were very empirical and gave, under the best conditions, only a rough measure of total chlorine demand. Detailed studies on the mechanism of the reactions involved have resulted in very decided refinements in these methods until they now have reached the point where a very definite measure of the real chlorine demand may be rapidly obtained. It is believed that one of the decisive contributions to the refinement of these methods has been the introduction of instrumental methods for determining the brightness of bleached pulps. In other words, in calibrating such a method against actual bleaching, the bleached pulp can now be brought to exactly the same readily designated brightness, through the use of such an instrument as the General electric reflection meter or similar apparatus. Hitherto, visual judgment had to be relied upon to determine this point of uniform degree of bleaching. The writers have, after thorough examination of several of these methods, decided in favor of the so-called "permanganate number" method of rapidly arriving at the chlorine demand of an unbleached sulphite pulp. As mentioned earlier in this discussion, this information is of great value to the personnel in the digester house in addition to serving as a guide in the actual bleaching of the pulp. Admittedly, the chlorine demand of a given cook is not a complete description of that pulp. Variations in this figure from cook to cook however, give valuable indirect evidence that the pulps have in some manner been treated differently during the cooking operation. This information when supplied to the cook as rapidly as possible after a cook is blown, and while the details of the particular cook are still fresh in his mind, serves as a valuable guide in the conducting of subsequent cooks. As a guide to the actual bleaching operation, these rapid tests may be made to indicate the exact amount of bleach to be used in every batch. If less precision is allowable, with accompanying diminished effort in supplying the chlorine demand for every batch, they may be made to serve as a more general guide by conducting only occasional check-ups through the day or at longer intervals. The recent introduction of continuous chlorinating systems allows the use of a simpler test to be used as a guide in the chlorination stage. This will be discussed in more detail in connection with the description of a specific installation.

Mill Practice

The remainder of this discussion will be devoted to the proposition that the average mill, with the aforementioned limitations, can, with a two-stage chlorine-hypochlorite system and the intelligent employment of a bleachability test, turn out a very acceptable product with greatly improved qualities as compared to the product from the old single stage hypochlorite bleach. The single stage process served the purpose quite well until the present-day standards of high brightness and high strength were demanded. Under these demands, the standards of quality came into opposition; that is, to achieve the desired brightness, treatment was necessary which destroyed the strength, and a procedure designed to preserve the strength gave pulps of variable and often low brightnesses.

The sulphite mill in question is one that was designed to originally produce only unbleached sulphite. Thus, no bleaching facilities were incorporated in the original layout. The subsequent addition of bleaching equipment was, therefore, made without wholly adequate planned space requirements, but was laid out largely within the room available. This resulted in a far from ideal equipment layout. The digester capacity consists of three digesters with a capacity of 75 tons per day. The cooking system used is the quick direct cook system. The bleaching equipment as finally evolved consisted of two 5-ton Wolf high density bleachers. With this limited capacity, the bleaching cycle of necessity was short. The bleaching was assisted by using a large dosage of hypochlorite bleach liquor and by direct steaming, except in summer, to raise the temperature. With steadily increasing demands for higher and higher colors for the bleached pulp demands resulting from rising standards in the brightness of papers being made, the quality of the pulp steadily declined.

A shift in emphasis on the grades being made in the paper mill about one year ago resulted in an imperative demand for a much stronger sulphite with equal or higher brightness than was being produced with the old system.

Investigation soon showed that the unbleached pulp exhibited the requisite strength, but that the bleaching was responsible for serious degradation of the pulp. The records showed that the lowering of the strength was particularly severe during the warm weather months. During these seasons, the warmer water and the heat of the bleaching reaction resulted in temperatures as high as 40-45 Centigrade. Such temperatures are known to contribute to rapid degradation of the pulp.

Control of Batch Processes

Previous successful experience with the batch chlorination of alkaline cooked pulps indicated chlorination of the sulphite pulp as the solution to the problem. Space considerations in view of the capacity required indicated against the adoption of batch equipment. In view of space and auxiliary equipment available, and the promise of small labor increase, continuous chlorination equipment was chosen. This equipment utilized rubber-lined metal for the chlorinating equipment proper. The chlorinated stock is made alkaline with milk of lime after about five minutes' reaction time with the chlorine with the result that the chlorinated stock lines, washer, and final thickener were not required to be made of corrosion resistant materials.

The control of the phase of the bleaching using this continuous equipment is very simple. Stock of regulated consistency is pumped through the system under a moderate pressure. Gaseous chlorine is introduced into the moving stock at a slightly higher pressure. This pressure differential is a rough measure of the chlorine-to-stock ratio. More specific information, to govern chlorine addition, is easily obtained by determining the residual chlorine in the stock just before the addition of the lime. By maintaining a reasonable constant chlorine residual, the inequalities in bleach demand of the entering brown stock can be compensated. In this way, a chlorinated stock is produced

which exhibits considerably less variation in bleach demand than the original brown stock. The amount of residual chlorine can be readily correlated with the fraction of the total demand being supplied in the first stage.

With a chlorinated stock of moderately uniform bleach demand, the second stage high density bleach requires only nominal control of the amount of bleach added to acquire the desired color, preserve strength, prevent waste of chlorine and bleach the wood dirt.

The results that have been obtained from the use of this bleaching scheme and the increased quality of the pulp can best be shown by actual data collected before and after the installation.

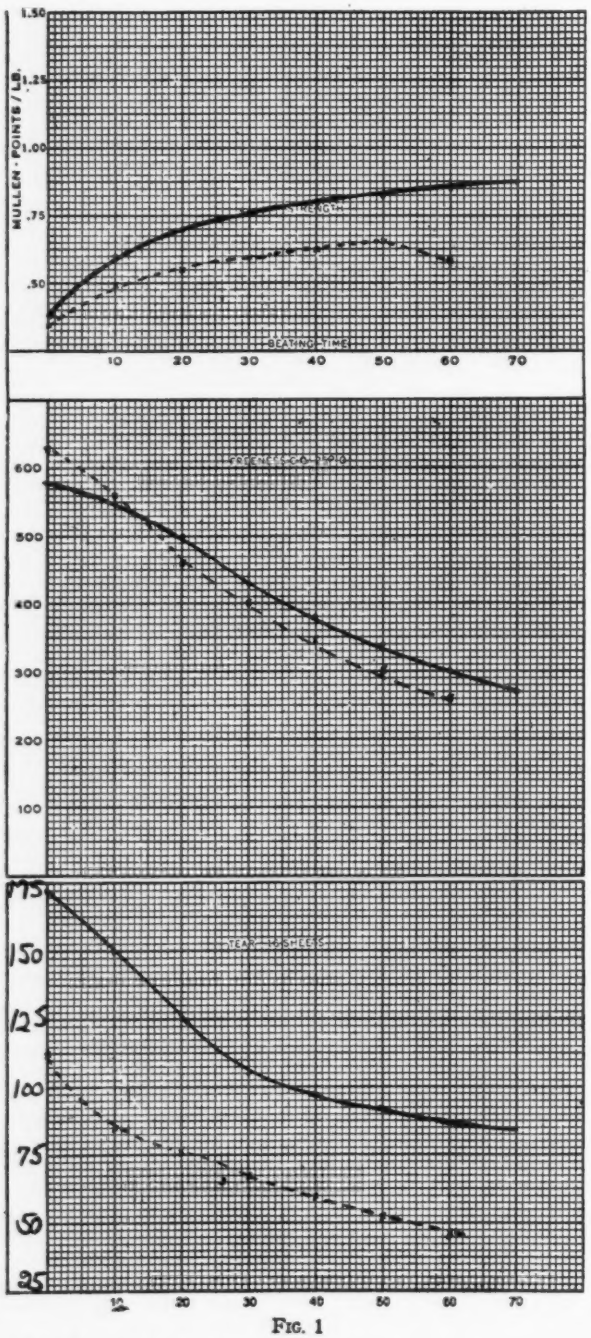

FIG. 1

TABLE I

Month	Average Maximum Mullen	Avg. Tear at Maximum Mullen	Average Beater Value
March, 1935	67.7	70.9	51.5
April	66.3	68.3	50.0
May	67.7	54.8	47.5
June	66.3	60.8	48.3
July	71.0	66.6	52.1
August	71.2	69.8	53.0
September	78.9	74.0	57.9
October	80.4	78.4	60.0
November	81.2	77.8	60.0
December	80.3	78.8	59.9
January, 1936	81.2	88.1	62.6
February	82.9	85.4	62.8
March	82.5	90.0	63.9
April	79.9	89.2	62.2
May	82.7	85.7	62.8

Table I shows the average of the laboratory beater strength tests made on bleached sulphite by months over a period of 15 months. The first six months shown for 1935 show all of the evils of the old bleaching system, including the adverse effect of warm water temperatures with resultant high bleaching temperatures. The small increase in strength shown for September is probably the result of two factors; namely, somewhat lower water temperatures and the very beginning of the occasional use of the bleachability test. From October until December 15, the same single stage hypochlorite system was used but the pulp going into each bleacher was tested for bleachability and the amount of bleach added was based strictly on the results of the test. Low water temperatures during this period allowed control of the bleaching temperature again. Beginning with January, 1936, the results to date represent the tests on pulps bleached according to the above-mentioned system. The results for March, April and May, 1936, as compared with the corresponding months for 1935, illustrate the total gains made over the old system under conditions of temperature, etc., that are directly comparable. In comparing the data for the months just preceding and after the change to the two-stage system from the controlled one-stage system, it will be noted that the gain in strength consisted largely in an increase in tear at maximum mullen. This gain in strength is not shown to best advantage by the maximum mullen figures for the reason that the paper mill does not often refine the pulp to the point that the maximum mullen is developed. From the standpoint of actual use, the gain in tear strength is substantially greater than the data in Table I indicates. A clearer picture is presented graphically in the two strength test reports shown in Fig. 1. These have been chosen as representative of the average tests for May, 1935, the lowest of the series shown in graphs as broken lines; and May, 1936, representing the higher level of strengths shown as solid lines.

It can be seen from the strength data that the new pulp refined to, say, 400-cc. freeness, an approximation to the mill treatment, shows about .75 points per pound mullen and 1.00 point per pound tear. Since these tests are made

PHYSICAL DATA

TEST NO. 1

Beating Time Min.	Sheet Weight 5 x 10 GMS.	Bursting Lbs.	Bursting Points/Lb.	Tear, Per Cent	Free C.C.	Beater Value
0	2.06	13.3	.35	112	630	45
10	1.98	17.9	.50	84	560	46
20	1.96	20.2	.56	77	460	47
30	1.92	21.1	.60	68	400	47
40	1.87	20.9	.62	59	350	46
50	1.90	23.4	.66	52	300	46
60	1.88	20.6	.59	46	260	41

TEST NO. 2

0	1.98	13.8	.39	172	560	62
10	1.94	21.7	.61	150	550	68
20	1.94	23.9	.68	126	500	66
30	1.92	26.7	.76	105	430	64
40	1.90	27.3	.79	98	370	64
50	1.90	27.8	.81	92	340	64
60	1.90	28.6	.83	86	300	63
70	1.92	28.8	.83	84	270	63

TABLE II

Month	Bleachability Expressed as Per cent Chlorine to Yield an 80 Brightness	Coefficient Variation Per cent
November	5.77	21.1
December	5.63	14.8
January	4.46	14.8
February	4.55	11.1
March	5.68	21.7
April	6.26	16.6
May	5.73	19.6

on oven-dry sheets, the air-dry tear figure would approach 1.5 points per pound for tearing strength with a small increase in mullen test. Such a pulp has been found well suited for a general purpose pulp, exhibiting a desirable balance of mullen and tear strength.

As a partial index to the characteristics of unbleached furnished for bleaching, the average bleachabilities of the washed brown stock computed by months are shown in Table II. This data has been compiled from routine bleachability tests on each cook, a procedure carried out since November, 1935.

The coefficients of variation of the cooks over this period are a value representing the average deviation from the average bleachability expressed in per cent. It is felt that the general decrease in variability from cook to cook indicates the value of keeping the cooks informed as to the quality of the pulp being produced. The value for March is out of line due to the intervention of temporary acid plant difficulties. Considering the fact that the value for each month is computed on about 200 cooks, the small differences assume significance and improvement in the variability of the cooks is evident.

As rough evidences concerning the preservation of strength of the pulp during bleaching, the average strength test results on one random selected unbleached sulphite cook per day during April and May are compared in Table III with the corresponding values from the bleached sulphite strength tests as shown in Table I.

TABLE III

	Unbleached Sulphite	Bleached Sulphite
April—Maximum Mullen	82.7	79.9
Tear Max. Mullen	82.8	89.2
May —Maximum Mullen	88.7	82.7
Tear Max. Mullen	80.4	85.7

The data, although too meager in the case of the unbleached tests to give high reliability, indicate a rather successful preservation of the strength of the unbleached stock during bleaching. The suggestion is evident that some mullen is lost in bleaching but that the tearing strength is actually increased.

The data presented seem to warrant the conclusion that in circumstances where multiple stage bleaching is contraindicated for reasons of space, investment, and the like, that careful control by means of bleachability tests and the use of a two-stage chlorine-hypochlorite system of bleaching will yield an acceptable bleached sulphite from spruce wood.

Air Conditioning of Paper and Printing Plants*

By W. G. Schlichting[1]

Paper ordinarily is never absolutely dry, but contains moisture in qualities varying from a little over none at all to approximately 20 per cent of its weight. The exact amount varies depending upon the kind of paper, the relative humidity of the surrounding air, and the amount of exposure. Table I shows the average moisture content of different kinds of paper at various relative humidities. It will be noted that within ordinary ranges a change in relative humidity of about 12 per cent will increase the moisture content approximately 1 per cent and will increase the moisture content in approximately the same ratio for all papers. Room temperature, while actually a factor, is usually disregarded since a rise in temperature of 10 deg. F. has only the same effect as a decrease in relative humidity of 1 per cent.

When paper is freely exposed to air, changes in moisture content usually take place quite rapidly. Changes may be very slow and uneven however if a part or all of the sheet is protected by others, as when stacked in a pile or covered with a waterproof wrapping. These facts are responsible in no small measure for many of the peculiarities in the behavior of paper and the troubles which printers not equipped with adequate air conditioning have to contend.

Paper Curling

As the paper absorbs moisture the individual fibers swell more in diameter than they do in length which causes a sheet to increase or stretch in width (the direction perpendicular to the fibers) a greater amount than the increase in length or the direction parallel to the fibers.

Paper will curl when the two sides of a sheet expand or contract unequally, and is quite often caused by sudden moisture changes. This may be due to differences in the finish of the two sides or else to the fact that more fibers may be parallel on the screen side of the paper than on top. As the sheet comes to equilibrium thruout, the curl will usually disappear.

When paper is piled, and that having a low moisture content is exposed to a high humidity wavy edges will occur. Likewise when paper of a high humidity content is exposed in piles to a low humidity, the edges will contact causing a bulge.

The moisture content of paper is quite a determining factor in its strength. With an increase in moisture content to a certain point, the strength will also increase. Be-

TABLE I

MOISTURE CONTENT OF PAPER IN PER CENT OF OVEN DRY WEIGHT AT VARIOUS RELATIVE HUMIDITIES

Paper	Relative Humidity 10	20	30	40	50	60	70	80	90
Printing (Sulphite cellulose)	3.6	5.2	6.3	7.2	7.8	8.5	9.5	11.5	14.9
Newsprint (Wood pulp, bleached 24 per cent ash)	2.1	3.2	4.0	4.7	5.3	6.1	7.2	8.7	10.6
Writing (Wood pulp, bleached 2.9 per cent ash)	3.0	4.2	5.2	6.2	7.2	8.3	9.9	11.9	14.2
Fine White Writing (Rag, 0.8 per cent ash)	2.4	3.7	4.7	5.5	6.5	7.5	8.8	10.8	13.2
Fine White bond (Rag 0.2 per cent ash)									
Commercial Ledger 75 per cent Rag, 0.6 per cent ash)	3.2	4.2	5.0	5.6	6.2	6.9	8.1	10.3	13.9
White Ledger (Rag, 0.9 per cent ash)	3.2	4.3	5.2	6.0	6.6	7.5	8.8	10.8	13.2
Index Bristol (50 per cent Rag, 1 per cent ash)	3.6	4.8	5.7	6.2	6.8	7.5	8.8	10.8	13.2
Kraft Wrapping (Coniferous, 0.3 per cent ash)	3.2	4.6	5.7	6.6	7.6	8.9	10.5	12.6	14.9
Rope Manila (75 per cent Manila & Jute, 1.5 per cent ash)	4.1	6.0	7.2	7.9	8.5	9.3	10.8	13.6	...
Brown Kraft	...	2.9	3.8	4.6	5.4	6.2	7.0	7.9	9.2
Offset (50-75 per cent Sulphite, 50-25 per cent Soda Pulp	...	...	3.5	4.5	5.6	6.6	7.6	...	...

* Presented at the annual meeting of the American Pulp and Paper Mill Superintendents' Association, Grand Rapids, Mich., June 24-26, 1936.

[1] Clarage Fan Co., Kalamazoo, Mich.

yond this point, the decrease in strength is gradual until at high humidities where the drop is quite sudden.

Moderately high moisture content increases the folding endurance of a paper. It is very important that good paper should withstand folding without cracking or breaking. In binderies or where folding is done a high range of humidities of 60 per cent or over is desirable.

Low moisture content decreases the conductivity of a paper, and permits it to store an electrical charge. Static electricity is generated by moving machine parts, belts, and by the paper itself as it rubs against metal, wood or other sheets. By keeping humidities above 45 per cent, the conductivity of paper is increased to such a point that charges are less easily generated by the paper and are grounded.

High moisture content in a paper retards absorption and causes spreading of an ink, while paper that is too dry will cause too rapid an absorption and penetration.

Weight of paper is affected directly by its moisture content. Where paper is bought or sold by weight this item has its influence and should not be overlooked in favor of other factors having greater effect upon its market value.

In unconditioned press rooms, most of the difficulties are experienced during periods of winter operation during which time the relative humidity may vary as much as 60 per cent from as low as 5 per cent to as high as 65 per cent and as much as half this amount in a day. Briefly then, winter difficulties in unconditioned press rooms are experienced due to lack of sufficient humidity. During summer the humidity may vary 70 per cent from 20 to 90 per cent, but due to the higher range usually less trouble is experienced. Troubles in a press room traceable to atmospheric conditions occur at times when the humidity is too high or low when it is permitted to vary and when the temperature is too low. Sheets which do not lie flat because of bulging, curling, or wavy edges are most difficult to feed, especially on automatic presses. Sheets in either of these conditions fail to meet the stops and grippers correctly. When presses must be stopped production is reduced and spoilage is high. In lithographing and offset presses sheets must be flat to prevent creases and wrinkles.

When humidities are kept at 45 per cent or over difficulties from static are usually eliminated without the aid of neutralizers and faster press speeds can be employed. Static will cause adjacent sheets to adhere to each other on the delivery and unless costly slip sheeting is resorted to.

Moisture content control is an important factor in press makeready time, an unproductive operation which is a major expense in fine printing. Registering of forms and setting of guides must be repeated when the stock has changed size between runs. If rollers are shrunken or swollen, soft or hard, form atmospheric changes, many hours may be taken in securing the proper rolling contact required for a satisfactory job. Repacking of the cylinder may be required where the humidity content is permitted to vary during the course of a run.

Correct register is one of the prime essentials of good printing or lithography. Poor register is most commonly caused by the sheet changing dimensions between runs. In multicolor printing a very close control of relative humidity is necessary for good results. Without adequate air conditioning good work cannot be secured and long delays for atmospheric conditions to become stable are often necessary.

It is evident that humidities in a press room should be maintained at a constant value, and since temperature has little or no effect on paper and press room operation except so far as keeping the ink between 70 and 80 deg. F. for best flowing, that the temperature may be raised above the winter setting somewhat during the summer months for economy of operation of dehumidifying equipment. Best results have been experienced with temperatures between 70 and 75 deg. F. and corresponding relative humidities of 45 to 50 per cent. The higher the humidity that is adopted as standard during summer weather the less expensive will be the initial and operating cost of an air conditioning system. In many localities straight humidification or the addition of heat at times to reduce the relative humidity of the air to the required point will suffice. In other localities, or where the nature of printing demands, dehumidification or the removal of the moisture from the air by chilling it below its dewpoint may be required.

In no case should unhumanly high temperatures (90 deg. F. or above) be resorted to in order to provide constant relative humidity without the use of dehumidification equipment. In casting rooms, sterotype or electrotype galleries adequate ventilation systems should be installed to carry away excessive heat.

The comfortable and healthful working conditions found in an air conditioned press room have been shown to increase production and to reduce labor turnover or absence from sickness to a minimum.

Paper manufacturers as a rule give a great deal of attention to the weight of paper as it leaves the machine and very little to the conditions surrounding the paper after it leaves the machine and has passed through the calender, finishing, and store rooms. These rooms should be maintained at a definite air condition so that the paper will not lose or gain moisture before it is packed and therefore will not be delivered to the printer with a varying moisture content. Unless such a procedure is followed the printer cannot depend upon receiving paper of a uniform moisture content and even though his press room may be air conditioned he may encounter production difficulties because of wavy edges, shrinking, and creasing.

On the other hand, some printers do not realize the necessity for controlling the atmospheric conditions in their plants and are prone to complain to the paper manufacturer about troubles over which the paper manufacturer can have no control. For example: suppose paper is shipped from the mill with a moisture content of 7 per cent, stored in a conditioned warehouse and then opened in an unhumidified pressroom where the relative humidity is only 20 to 25 per cent during periods of winter operation. The result would be that the edges of the sheets in a pile would contract and cause a bulge. Sheets completely exposed would change in dimension.

If the paper had come to the printer at a lesser moisture content say about 4 per cent, there would be no cause for complaint during winter periods, as this moisture content corresponds quite closely to a relative humidity of 20-25%. However, if such were the case during summer operation in which the indoor humidity might be 60 per cent, the paper will absorb moisture and the edges will become wavy and the sheets will stretch and curl.

In either of these cases register troubles would be experienced unless the paper was preconditioned to pressroom conditions and then maintained at a constant moisture condition.

Static, low folding endurance and other difficulties are only overcome by proper moisture control. Therefore, it is evident that regardless of what the paper manufacturer may do, the printer is certain to have his troubles unless he adopts air conditioning. The paper manufacturer can however cooperate by controlling the moisture content in paper shipped by him to a percentage corresponding with the optium press room humidity. The wholesaler also can cooperate by controlling the atmosphere in his warehouse so that the moisture content of the paper will not change while in his keeping. Such cooperation will be mutually beneficial to all parties.

Developments in the Preparation of Coating Color Mixtures*

E. G. Milham[1]

The preparation of coating color may conveniently be divided into seven phases as follows:

1. Preparing or "cutting" the casein or other adhesive.
2. Wetting out the dry pigments such as clay, carbonate of lime, etc.
3. Bringing the wetted pigment into intimate contact with adhesive.
4. Preparation and incorporation of dyes or other tinting materials.
5. Introduction of levellers, de-foamers and setting agents.
6. Straining.
7. Super-mixing or "jordaning" subsequent to straining.

Preparation of Adhesive

At present, by far the most important adhesives used in the coated paper industry are casein and specially treated starches; the latter performing a comparatively minor role. The preparation of the treated starches is an extremely simple operation consisting of stirring the starch with the desired quantity of cold water and subsequently heating it with direct steam to 180 to 200 deg. F. and cooling it back to about 90 deg. F. by addition of more cold water. It is, of course, necessary to carefully measure the water added both before and after cooking; making due allowance for the water condensed from the steam. As a rule, the cooking is done in a vertical cylindrical tank provided with an agitator and cover. The water is measured by means of permanently fixed marks on the inside of the tank.

The proper preparation of casein is a rather difficult and very important operation. Casein comes to the mill either as a crude dried curd or as a coarsely ground powder. If in the crude form it must be ground before being put into process. Excessively fine grinding is undesirable because it increases the difficulty of wetting and causes the casein to cut much too fast. The dust which is in the finely ground product is also a source of constant annoyance and waste. A properly ground casein should all pass a 10-mesh screen and not more than 10 per cent of it should be fine enough to pass a 40-mesh screen.

After the casein has been properly ground, it is mixed with cold water in a tank provided with a suitable agitator. A jacketed steel tank is highly desirable for this work because it obviates the necessity of using direct steam for heating. As soon as the casein has had a chance to become thoroughly soaked with water (which usually requires ten to thirty minutes) the cutting chemical is added. A number of chemicals may be used for this work. Chief among them are soda ash, caustic soda, ammonia, borax, tri-sodium-phosphate, silicate of soda and bicarbonate of soda. These chemicals differ decidedly in their reactive powers and, if injudiciously used, can cause serious injury to the casein and irreparable damage to the finished coating color. A good standard formula consists of 100 pounds dry casein, 8 pounds soda ash and one gallon of commercial 26 degree ammonia, along with 400 pounds of water. At this concentration, the addition of the cutting chemical causes the mixture to become very thick and it is usually necessary to warm it up to about 140 deg. F. to facilitate complete cutting. After cutting, it is advisable to cool the mixture back to about 90 deg. F. A cold water connection on the jacketed tank is very convenient for this purpose. The casein tank should be kept as clean as possible all the time and should be thoroughly sterilized with boiling water and a little formaldehyde every week-end. This practice will minimize loss of casein through partial decomposition as it is being used during the week.

Wetting Out Dry Pigments

Most pigments come to the mill in the dry form and it is advisable to wet them out thoroughly before bringing them in contact with the casein mixture. This may be accomplished in a number of ways. Probably the best system consists of introducing a weighed quantity of dry pigment and water into a pebble mill and grinding it thoroughly, after which a weighed quantity of prepared casein or other adhesive is added and ground into the wetted pigment. This system has the advantage of being simple, controllable and thorough, with minimum power consumption. The chief disadvantage of the system is the rather high initial cost of equipment and its inflexibility.

In the less expensive and more commonly used systems, the pigment and water are mixed in a heavy slurry from which aliquot portions are weighed out to be mixed later with the casein. The disadvantage of this system lies in the fact that the pigment is not thoroughly mixed with the water and that the strength of the mixture is not the same from point to point in the tank. This introduces variables which are often difficult to overcome. The difficulty is eased somewhat if the fluidity of the heavy slurry is increased by the addition of about one-half of one per cent of a dispersing agent such as soda ash, silicate of soda or tri-sodium-phosphate.

A very recent and more or less experimental wetting system consists of violently agitating a very thin 20 per cent pigment-water mixture, straining it and bringing it back to a relatively fixed density by means of an automatic vacuum filter. The thickened slurry is dropped into a mixing tank from which it is weighed out to be mixed later with the casein or other adhesive. This method is as thorough as the pebble mill system and has the added advantage that it does not grind up the undesirable impurities in the pigment such as mica, grit, pieces of wood, etc. However, the system is cumbersome and expensive and it is doubtful whether it will ever be very widely used in the coated paper industry.

Mixing the Adhesive and Wetted Pigment

The pebble mill is probably the best method ever devised for bringing the pigment into intimate contact with the adhesive and is in use in many places at the present time. However, the high cost of the necessary equipment has greatly retarded its general adoption by coated paper manufacturers. In many coating mills, the adhesive and pigment are mixed by stirring them together in an agitating tank. The agitation, of course, cannot be too violent on account of the hazard of whipping the color into a froth.

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[1] Watervliet Paper Co., Watervliet, Mich.

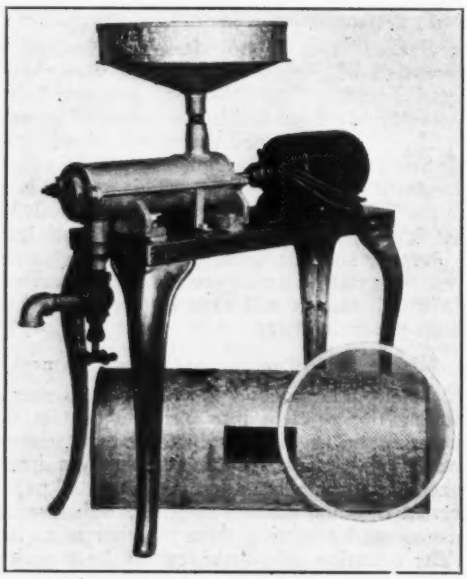
On the other hand, it must be sufficiently violent to bring the pigment into intimate contact with the adhesive. As a rule, this system is quite ineffective in producing an adequately mixed product. The use of "super-mixers" or "color jordans" described in a later paragraph greatly helps toward minimizing the shortcomings on the "paddle" method of color preparation.

Incorporation of Tinting Materials

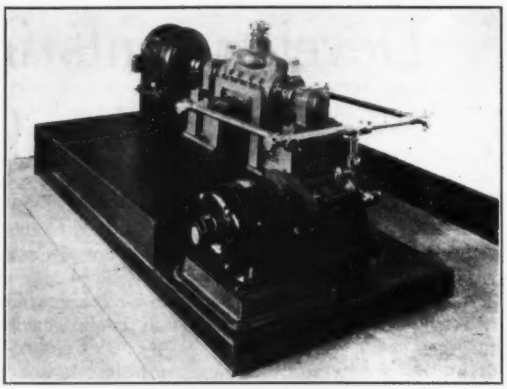
Tinting materials may be classified as water soluble dyes, dry dispersible pigments and paste pigments. Difficulty is frequently encountered on deep shades due to the necessity of minimizing the quantity of water used for dissolving the dyes or dispersing the pigments. When large amounts of tinting colors are used, it is necessary to keep the coating mixture as heavy as possible so that the greatest possible quantity of water may be used for dissolving the dye or pigment. Of course, the characteristics of the dye must be studied in advance so that it will be known whether hot, cold, luke-warm or alcoholized water can be used to best advantage. After the color has been dissolved or dispersed, it should be strained through a fine wire cloth to assure the absence of color specks. This is especially important in the case of pigments such as ultramarines, tungstate lakes and chrome colors. In the case of colors which come to the mill in pulp form, it is advisable to transfer them from the barrel to a covered agitating tank in order to assure a constant density of color. Of course, this precaution need not be observed when relatively small quantities of the pulp pigment are being used.

Introduction of Special Chemicals

It is often necessary to add levelling agents or de-foamers to the coating mixture in order to assure a free flowing color and the absence of fat spots and pin holes in the finished paper. At present, the most satisfactory levelling agents are made from vegetable oils, such as castor oil, which have been treated to make them miscible with water. The treated oils are extremely sensitive and if not intelligently handled will break down in the coating mixture with the formation of particles of free fat which cause oil spots or "fish eyes" in the finished coated paper. These oils should be added after the coating has been strained and should be added in dilute form; not over 20 per cent of full strength. Care should be used to see that the diluting water is sufficiently alkaline to keep the oil from breaking down.



Crane Color Jordan



Lancaster Disperser

In case a waterproof coated sheet is desired, it is necessary to add a setting agent such as lime water or formaldehyde. Since these agents cause condensation or thickening of the mixture, it is necessary to use them with care. In the case of formaldehyde, it is best to dilute it with an equal volume of ammonia and ten volumes of water. The diluted mixture should be added not faster than two quarts a minute and the coating mixture should be under vigorous agitation during the time the formaldehyde is being added.

Straining

One of the most important operations in the preparation of coating color is that of straining. For many years, the standard equipment for this operation was an 80-mesh sieve fitted with a revolving scrub brush, which scrubbed the lumps, grit and dirt through the sieve along with the coating color. These rotating brush sieves have been almost entirely replaced by either centrifugal screens, such as the rotospray, shaker screens, vibrator screens or gyratory strainers. The centrifugal screen has always proven very efficient and economical; but its inherent tendency to aerate the coating mixture has caused a considerable decrease in its popularity during the past year or so.

The outstanding development in color preparation during the past year has been the introduction of colloid mills, dispersers, and the color jordan. All these machines have been developed because it has been generally recognized that the paddle method of color preparation does not give an adequate blending of pigment and adhesive. This faulty mixing has for years been the underlying cause of many of the commonly recognized coating mill troubles such as brushy paper, sticky color, spots, pin holes, lumps, shade variation, weight variation, etc. Of course, improved screening devices have helped the situation considerably; but have come a long way from solving the problem. Figs. 1 and 2 show two recently developed machines for grinding the strained coating mixture. The first is known as the Lancaster disperser and the second as the Crane color jordan. Both machines operate on the principle of agitation at close clearances at extremely high velocity out of contact with air. The secret of the success of these machines lies largely in the fact that they are carefully designed to avoid the possibility of air entering the system. This permits the extremely violent agitation without the possibility of making the coating foamy or fluffy. Of course, it is too much to hope that machines of this type will eliminate all the coating man's troubles. However, they appear to be most certainly an advance step in the right direction.

Modern Trends in the Manufacture of Kraft Pulp and Paper*

By R. M. Radsch[1]

At least half a century has passed since C. F. Dahl inaugurated the processes of kraft manufacture in Sweden and the last twenty-five years have witnessed the entire growth of the industry in the United States. The development has been rather rapid resulting in the production of approximately one and a half million tons of pulp in 1935 and recent activity in kraft pulp and paper mill promotion and building in the south will increase this production by one-half million tons yearly within the next year and a half. A remarkable growth that will no doubt continue for some time to come.

Chemical Recovery

The recovery of chemicals has always constituted the major problem in this process of pulp making and its improvement has been the constant aim of the chemist and engineer. Closely following the practices developed in the production of soda pulp the early recovery constituted the causticizing equipment, smelting furnace, rotary incinerator, disc and steam evaporators. This remained standard equipment for many years and is still in use in kraft mills at the present time.

In 1915 an outstanding American chemical engineer, Hugh K. Moore, developed at the La Tuque, P. Q. mill of the Brown Company, the first radical innovation in this standard procedure introducing special evaporators and heaters in the production of high temperature and highly concentrated black liquor which was sprayed into specially constructed furnace and boiler units for the production of both smelt and steam. This installation eliminated rotary incinerator and disc evaporator and was the forerunner of modern developments in soda recovery. A short time later the Wagner furnace was introduced and various modifications and refinements of these original innovations constitute modern recovery practice in kraft pulp mills. More than thirty years ago patents were issued on furnaces utilizing sprayed black liquor, but actual installations were not forthcoming. The fact remains that when the combustion engineer stepped into the picture and worked with the kraft pulp mill technician the real development and success of the new type recovery became assured and today a soda recovery unit is a highly specialized combination of chemical reclamation and steam production. A number of systems are being used commercially at present. Two of these, the Ross-Wagner and the B. & W.-Tomlinson utilize a steam vacuum evaporator concentrated black liquor to spray into a combined smelting furnace boiler unit. These units are generally rated at 50 to 75 ton capacity and use black liquor containing about 60 per cent solids at 60 deg. F. The furnace walls are water cooled and a chrome base refractory is generally used in the smelting zone. Salt cake is dissolved in the black liquor and either stationary or oscillating nozzles, delivering a rather coarse spray, inject the black liquor into the furnace. Chemical reduction in these furnaces averages about 90 per cent and chemical recovery about 95 per cent. The cooking liquor sulphidity generally stays at 35 per cent and salt cake losses at furnace are about 100 pounds. The maintenance cost per ton seems to vary from 15 to 20 cents. Standard and high pressure boilers are being used and present installations produce from 9 to 10 thousand pounds of steam per ton of pulp.

The Waern recovery unit is a greatly improved modification of the original standard installation. It comprises a water cooled smelting furnace unit, rotary incinerator discharging black ash directly into the furnace, boiler unit and disc evaporator for the recovery of chemicals from the flue gases prior to their discharge. Units of this type are in use producing from 35 to 100 tons of pulp and maintenance costs, chemical efficiency and steam production are very similar to the figures given for the spray units.

A very interesting and theoretically ideal development of late has been the Goodell system of kraft chemical recovery. A combined smelter boiler furnace is fired with a 98 per cent dry powder containing the chemicals to be reclaimed. The hot furnace gases pass directly to the boiler after which they enter a spray dryer into which black liquor containing 55 to 60 per cent solids is being sprayed by high speed mechanical atomizers. The fine dry powder produced is conveyed from the spray dryer and delivered to the furnace for feeding. Remaining flue gases pass through scrubbers utilizing partly concentrated black liquor. Goodell units have been in operation for some time and are built to produce from 25 to 100 tons of pulp. Steam production is claimed to reach 13,000 pounds per ton of pulp produced with a 90 per cent chemical reduction in the furnaces. A very pronounced feature of this system seems to be the high percentage of sulphidity shown in the cooking liquors. This seems to average a little higher than 40 per cent and is claimed to be an important factor in the production of very superior grades of pulp at high yields. Other systems have been developed such as the Kernien which have not been placed on the market but are producing results in steam production and chemical savings similar to those shown in above types. At present, due to the great development of the kraft industry in the south, constantly larger smelter boiler units are being installed. Modern units of this type should produce enough steam for the entire operation of a kraft pulp mill with perhaps 10 per cent to spare for the use of the paper mill.

Cooking and Washing

The digester building equipment has seen very little change and both tumbling digesters and the stationary type are still being used. Mills erected during the last few years in this country have installed stationary digesters exclusively and the units are larger in size than was formerly the case.

Liquor circulating and preheating systems used in connection with stationary digesters have led to improvements in quality and economies of pulp cooking. Reverse circulation results in easier and better blowing of the digester charge. Late years have seen minor improvements in the mechanics of digester and diffuser manipulation resulting in labor saving and ease of operation. Many of these have

* Presented at the annual meeting of the American Pulp and Paper Mill Superintendents Association, Grand Rapids, Mich., June 24-26, 1936.
[1] Appleton Machine Co., Appleton, Wis.

been developed in Sweden and are now being adapted in this country. The Sandberg central valve connecting the digester blow line to the diffusers is a marked improvement over previous devices used and the Sandberg motor driven ball bearing swivel joint together with the quick connecting coupling which easily connects and disconnects the diffuser piping connections, removes many of the troublesome features formerly connected with this detail of operation. Special wash covers seal the diffuser necks during washing operation. The former laborious job of washing out pulp from the diffusers have been eliminated by the introduction of the Sandberg automatic diffuser valve which is handled from the operating floor and easily and automatically empties the pulp from the diffusers. Surface condensers have been used quite extensively to recover the heat in the digester blow steam and properly installed units of this type easily produce all of the hot water necessary for diffuser pulp washing. Troublesome features of surface condensers for this purpose are claimed to have been eliminated by the Rosenblad combined spray condenser, accumulator, filter and spiral heat exchanger to recover the heat units from digester blow steam.

The use of the diffuser in pulp washing is still standard practice and in spite of much work done by manufacturers of vacuum drum washers in the washing of kraft pulps nearly all of the new mills being built still retain the diffuser for this purpose. However, late developments and improvements in vacuum drum washer design seem to finally indicate the success of this type of pulp washing. Oliver drum filters have been used for some time in the recovery of black liquor from soda pulps. Attempts to use them with kraft pulps met with very mediocre success for a number of years especially in attempting to wash pulp made from southern pine woods. Successful installations in mills using northern jack pine and western hemlock have been in existence for some years. Lately a new type of Oliver Young filter, operating in two units having a capacity of 100 tons each on which primary and secondary washing is done and utilizing secondary wash on the primary filter is producing black liquor to the evaporator at 12 deg. Be′ with a loss of approximately 50 pounds sodium carbonate per ton of pulp. All trouble from foam has been overcome. It seems that these new developments indicate with a certainty that the problem of washing kraft pulp made from either northern or southern woods on vacuum filters has been successfully solved.

At various times attempts have been made to utilize the screw press in the removal of black liquor from kraft pulp. The efforts do not seem to have met with success and I know of no installation of this kind being used successfully for this purpose. The old type horizontal tube vacuum steam evaporators are rapidly being supplanted by the forced circulation and film type equipment. Their use results in greater capacity and foaming and deposits of organic matter on tubes are eliminated. They are more efficient in steam consumption and produce a higher density liquor.

Causticizing

Great improvements have been made in the causticizing department of kraft mills. Green liquor from the smelting furnaces is clarified in four compartment tray thickeners. Dregs from this are washed in four compartment washing thickeners before being discharged to the sewer. Both reburned and fresh lime are fed continuously into rotary lime slakers where the lime is hydrated by the use of green liquor. Diluted milk of lime is passed generally through Dorr bowl classifiers to remove solids after which the lime liquor enters causticizers, generally three in number, connected and continuous in operation. After about two hours of causticizing the causticized liquor passes three compartment thickeners discharging the green liquor to storage and the sludge to another three compartment thickener for washing. From here the sludge goes to vacuum filters for final washing and re-watering. The washed and de-watered cake feeds to a rotary kiln for burning and the reburned lime from this kiln is again used in causticizing. These continuous and high capacity installations reduce labor and result in improved economies. The availability of reburned lime is about 80 per cent and from 100 to 125 pounds of make-up lime are required. Sodium sulphate losses are less than one pound per ton. My experience with installations of this type indicate a saving of from $1.00 to $1.50 per ton of pulp produced.

The introduction of the various improved types of modern equipment in the operation of kraft pulp mill recovery has done away with a great deal of the unsatisfactory working conditions that formerly were connected with this industry and many worthwhile economies in chemical consumption have been effected. I can safely say that modern mills should operate consistently with a sodium sulphate consumption of not to exceed 260 pounds per ton of pulp produced.

Improvements But No Radical Changes

Wood handling and wood room equipment has seen improvements but practically no radical changes. Barking drums are still of the conventional type and chippers, screens and other wood room equipment has seen comparatively little change. It seems to me a field exists for a barker that will successfully take care of eight foot wood thus eliminating the use of saws and materially simplifying wood room operation.

Perhaps the least amount of change in the production of kraft paper has taken place in the paper mill proper. Many opinions prevail as to the correct refining machinery to be used in the preparation of pulp for the paper machines. Many mills, making high grade papers, prefer to do the greater part of stock preparation in the beater, using the jordan as a secondary refiner only. Rod mill installations are still used in some cases but do not seem to have found favor with many of the mill operators. The practice in southern mills in refining pine fibre has been confined almost exclusively to the use of the jordan. With the introduction during the last few years of high consistency beaters, such as the Vortex, refining of kraft pulp has become more rapid and efficient than was possible with equipment heretofore used. Kraft paper manufacturers are installing this equipment to increase the quality of their paper. High speed jordans have lately been introduced. I have been unable to gather any definite data pertaining to this type of equipment. In fact, it is very difficult to obtain reliable information regarding the performance of refining machinery in the paper mill as the methods employed and results desired vary in practically every mill.

Conclusion

In conclusion it may be stated that the modern kraft pulp and paper mill is a very intricate and highly specialized development in the chemical engineering field and not until late years with the entrance of the combustion engineer into the field has this problem been attacked from the proper engineering angle. As a result of this cooperation much has been learned as to the details of operation and the achievement of economies. The final result has been of great benefit to the industry and will no doubt mean a great future expansion in kraft pulp and paper manufacturing in the United States.

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Analysis and Testing

Pulp Testing References for 1934. Donald E. Cable. Paper Trade J. 101, No. 10: 36-40 (Sept. 5, 1935).—A compilation of 108 references.—A. P.-C.

The Technique of Determining Moisture Vapor Transmission Through Papers and Board. Donald K. Tressler and Clifford F. Everes. Paper Trade J. 101, No. 10:33-35 (Sept. 5, 1935).—The following refinements have been found to increase greatly the accuracy of tests previously used to determine moisture vapor transmission through papers and boards; careful control of the humidity of the test chamber, bringing the papers to be tested to equilibrium with the atmosphere of the test chamber, starting the test period 48 hrs. after the apparatus is placed in the chamber, extension of the test period to 5 days, and determination of the rate of moisture vapor transmission below 0° C as well as at 21.2° C. Data, obtained by the modified method, are presented which give the rate of moisture vapor transmission of some moisture-proofed transparent papers and boards.—A. P.-C.

Some Observations on Paper Testing Problems. F. T. Carson Paper Trade J. 101, No. 8:31-34 (Aug. 22, 1935).—A discussion of the scope and purpose of paper testing and of the manner of approaching a testing problem and developing a testing method, with a plea for standardizing paper testing nomenclature.—A. P.-C.

Strength of Paper in Theory and Practice. Report from the technical paper testing laboratory of Werkes Papyrus of Zellstofffabrik Waldhof. Wochbl. Papierfabr. 66, No. 27:512-15; No. 29:545-48 (July 6, 20, 1935).—The influence of the shrinking of the fibers on the dryers and the mechanical action to which the fibers are subjected to are studied in relation to the strength properties of the finished paper. The fold test is most sensitive to changes in process or raw material. The factors effecting the stretch are studied and results plotted on a graph.—J. F. O.

Several Experiments with the Schopper Torsion Tester for the Determination of the Twisting Number of Cable Papers. R. Korn and C. Boerner. Zellstoff Papier 15, No. 2: 52-54 (Feb. 1935).—Conditions and factors effecting the results are worked out by means of mathematics. The twisting number decreases with the thickness of the paper, although between papers of 39 grams per square meter and 92 grams the difference is slight.—J. F. O.

Sensitive Balance for Determining the Uniformity of Papers. R. M. Loebe and W. W. Loebe. Zellstoff Papier 15, No. 4; 146-49 (April, 1935).—Description of a new sensitive balance on which paper can be weighed more accurately, especially the lower weights, which is easy to use and has a low cost. The principle of the balance is described by means of illustrations and diagrams.—J. F. O.

Progress in the Testing of Paper and Pulp During the Year 1934. Korn. Wochbl. Papierfabr. 66, No. 16: 305-07: No. 17: 320-21 (April 20, 27, 1935).—The use of the fluorescence microscope for fiber analysis; the use of the microscope together with polarized light for distinguishing genuine parchment from imitation; a method for differentiating between casein and glutinous substances; extracting the starch from the paper by means of dilute acetic acid and determining the starch content by colorimetric method; the testing of the smoothness of paper, the measurement of the color of the paper; simplification of the copper number of pulps; and new method and apparatus for testing the physical qualities of pulps. Numerous references are given from the literature of various countries.—J. F. O.

Testing of Paper for the Permeability of Bacteria. Brunno Schulze, Wochbl. Papierfabr. 66, No. 18: 345-46 (May 4, 1935).— Bacillus prodigiosus was chosen for test purposes since it is harmless. The bacillus was sprinkled on top of the paper to be tested underneath of which was the nutrient medium. The porosity of the paper is the most important factor effecting the permeability of paper to bacteria.—J. F. D.

Contribution to the Knowledge of Methods for Measuring Fiber Length. W. Brecht & H. Mory. Zellstoff Papier, 14, No. 12: 492-95 (December 1934); 15, No. 4: 150-53; No. 6: 237-38 (April, June, (1935).—The author first briefly describes former methods for measuring the length of fibers, and their short-comings. Next the method advocated by the authors is described, the preparation of the sample, the influence of stock dilution on the results, the required number of fibers, average fiber length and frequency curve, and the determination of the principle length. Numerous tables of results are added.—J. F. O.

Hardness and Softness of Printing Papers. J. Bekk. Zellstoff Papier 15, No. 7:284-86 (July, 1935).—The author first discusses the importance of hardness and softness of paper from a printers standpoint; then describes the testing apparatus, and finally the results using different types of paper.—J. F. O.

Testing Paper for Printability. Julius Bekk. Papier-Fabr. 33, No. 16: 137-43; No. 17: 145-51 (April 21, 28, 1935).—The three important factors in determining the printability of paper are: smoothness, hardness and absorption. The author tests a number of different grades of paper, describes the testing apparatus and tabulates the results.—J. F. O.

Report of the Work Carried Out During the Year 1934 By the Committee on Strength Testing. Ernst Unger. Papier-Fabr. 33, No. 18: 153-58: No. 19: 161-65 (May 5, 12, 1935).—Description of tests and results of strength testing, using the Jokro-Muhle as beater and the Rapid-Kothen for making the test sheets. Tests were made with several pieces of apparatus to show how close they checked, and then comparisons were made with the standard pieces of apparatus from other pulp and paper producing countries.—J. F. O.

TAPPI Section, Page 27

Report on Paper Microscopy from the State Bureau for Testing Materials at Berlin Dahlem. Bruno Schulze. Papier-Fabr. 33, No. 19: 165-67 (May 12, 1935).—The author discusses the differentiation between genuine and imitation parchment papers by means of a test for detecting amyloids in genuine parchment paper; discussion over the Shaffer method for distinguishing the different fibers in a mixture of bleached sulphate and bleached sulphite by means of brasilin which according to the results of the author is unsuccessful; differentiation between linters and cotton fibers; and the coloring of a mixture of ground wood and chemical pulp for microscopical determination according to the method of Schulze.—J. F. O.

Stenographic Report of the Meeting of the Committee for Strength Testing of the German Pulp and Paper Association, December 8, 1934 at Berlin. Papier-Fabr. 33, No. 20: 169-72; No. 21: 177-80 (May 19, 26, 1935).—A round-table discussion of the strength testing of pulp by means of the Jokro-Muhle beating apparatus and the Rapid-Kothen sheet machine in which it was decided that reproduceable results are possible by using the above apparatus. Other foreign methods were compared.—J. F. O.

Instrumentation in Brightness Grading. Myrl N. Davis. Paper Trade J. 101, No. 1: 36-44 (July 4, 1935); Technical Association Papers 18: 375-383 (1935).—A fairly complete description is given of the General Electric Reflection Meter (or "Brightness Tester"), covering in some detail the precautions necessary to insure accuracy of the results obtained with the instrument and giving a tentative formal definition of the "brightness" of paper intended to make that quality a little less a coefficient measured by a particular instrument with particular characteristics and a little more of a physical property.—A. P. -C.

Apparatus for Testing the Color Constancy of Materials. G. F. Bedford. Paper Maker & Brit. Paper Trade J. 89, No. 6:442, 444 (June, 1935).—A brief description of the Philips Color Constancy Testing Apparatus.—A. P. -C.

Reflection Measurements on Pulp and Paper. Richard S. Hunter. Technical Association Papers 18: 405-409 (1935); Paper Trade J. 100, No. 26:37-41 (June 27, 1935).—An explanation of the gloss, "brightness," opacity, lightness, color and surface texture of pulp and paper as they are evaluated by visual observation and inspection and by physical measurements of reflected light, respectively.—A. P. -C.

The Dependence of Reflectance and Opacity on Thickness: Relation Between Contrast Ratio and Printing Opacity. Deane B. Judd. Technical Association Papers 18:441-442 (1935); Paper Trade J. 101, No. 5:40-41 (Aug. 1, 1935).—Two families of graphs have been prepared from the Kubelka-and-Munk formula. Each curve of the first family refers to different thicknesses of the same material characterized by its reflectivity $R\infty$; it shows the increase in opacity and in reflectance as thickness is increased. Each curve of the second family refers to layers of constant thickness and scattering coefficient; it shows the increase in opacity produced by decreasing the reflectivity of the material (such as by adding dye) and also the attendant decrease in reflectance.—A. P. -C.

Definition of Brightness. L. C. Lewis. Technical Association Papers 18, 397-400 (1935); Paper Trade J. 101, No. 16:36-39 (Aug. 8, 1935).—A general discussion dealing with the array of facts about diffuse reflection, the existing definitions of brightness, ideal and practical and the likenesses and differences connecting paper makers' "brightness" with the Grading Committee's "brightness."—A. P. -C.

The Modified Oxford Glossmeter. Otto Kress and Howard W. Morgan. Technical Association Papers 18: 409-410 (1935); Paper Trade J. 100, No. 26:41-42 (June 27, 1935).—The instrument was developed to overcome the defects of the polarization glarimeter. Light is projected on the sample at 15° with the surface and specularly reflected to a photo-electric cell; the per cent gloss is taken as the ratio of the light reflected from the sample to that reflected from a standard highly polished black surface. The advantages of the instrument over the polarization type of glarimeter are discussed.—A. P. -C.

Resistance of Fibrous Materials to the Action of Light. I. I. Kovalevskii. Bumazhnaya Prom. 14, No. 2:13-23 (Feb., 1935); C. A. 29, 5264.—Slight changes produced in the resistance to breaking after 84-100 hours of exposure showed that the intensity of the carbon arc light commonly used is insufficient for the rapid laboratory tests of the insulation effect on the physical properties of paper and fiber-board. Similar tests with hand-made sheets from unbleached sulphite pulp, sulphate kraft, straw pulp (common and Sudakov), mechanical wood pulp, linen rags, cotton, spruce, jute and a mixture of 60 per cent wool and 40 per cent kraft by exposure to the action of a Sperry carbon arc lamp of 150 amperes, 179 volts and 95,000 candle power at a distance of 1.3 meters for 20 hours gave satisfactory results. All materials showed a decrease in the resistance to breaking of 15-59.5 per cent, with unbleached sulphite most and jute and the 2 straw stocks least affected, which contradicts the prevalent idea of the excessive destructibility of materials derived from lignified fibers. The stretching power of all materials was impaired but to a less degree than the resistance to breaking. Mechanical wood pulp and wool showed an increase in the stretching ability. The tests showed that in the process of aging by the action of heat and light, all grades of paper undergo an insignificant change in their tearing length and that this factor is less characteristic of the physical changes than the resistance to breaking. The sorption of anthracene oil of all materials was but little affected, except that of wood pulp and wool was slightly improved.—C. J. W.

Consumption of the Oxidizing Agent by Wood Pulp. H. Ahlquist. Svensk Pappers-Tidn. 38, No. 12:394 (June 30, 1935).—Experiments with sulphate pulps have shown that the permanganate number is always five times as large as the Roe chlorine number, or calculated on the basis of milligram equivalents per gram pulp, the permanganate consumption is about twice as large as in the case of chlorine, whatever the cooking degree of the pulp. This rule does not hold for sulphite pulps; two laboratories using the same method obtained quite different results.—C. J. W.

Two New Chemical Testing Methods for the Paper Industry. P. Guillot. Ind. carta 2, no. 4:179-180 (April, 1935).—A new colorimetric method is described for determining the cooking degree of wood pulp by estimating its lignin content. It depends upon the formation of a yellow color upon the addition of a sodium derivative of nitrophenylnitrosamine. Directions for preparing the reagents are given. A rapid method for the determination of saponified rosin soap has been developed and applied to the analysis of Delthirna size milk. It depends upon the addition of a known excess of sulphuric acid, filtration and titration of the excess sulphuric acid in the

filtrate with standard sodium hydroxide solution.—C. J. W.

Differentiating Between Parchment Paper and Its Imitations. E. Debenedetti. Ind. Della Carta 1:401-403 (Sept., 1934); Chimie & Industrie 33:1192 (May, 1935).—Boil the sample a few minutes in a 3 per cent caustic soda solution; parchment paper remains unchanged, while substitutes are disintegrated into pulp. If the solution is exactly neutralized and treated with a tannin solution gelatin, which is usually present in the substitutes, yields a whitish precipitate. Analysis should be completed by a microscopical examination.—A. P.-C.

Specimen Supporting Device. David C. Scott assignor to Henry L. Scott Co. U. S. pat. 2,002,552 (May 28, 1935).—The invention provides various features of construction of the specimen supporting and clamping device of the bursting tester described in U. S. pat. 1,878,193 of Sept. 20, 1932.—A. P.-C.

Photoelectric Comparator. Clayton H. Sharp and Howard J. Eckweiler assignors to Electrical Testing Laboratories. U. S. pat. 1,999,023 (April 23, 1935).—The device and method of the invention enable the radiation from a source, *e.g.*, an illuminated slit, to be directed alternately over two separate paths in one of which the transmitting or reflecting sample can be inserted. Means for diminishing the intensity of the beam in a measured amount are included in one or both paths. The two paths are re-united at the photo-electric cell and a condition of equality is found between the two beams; in this way the amount of absorption loss is measured, and since both beams are supplied from the same lamp, the effect of fluctuations in its intensity are eliminated.—A. P.-C.

Automatic Measuring Apparatus. William A. Darragh. U. S. pat. 1,996,233 (April 2, 1935).—The invention relates to equipment and methods for automatically measuring differences in light transmission, and can be applied to stock consistency regulation. The essential feature of the invention consists in directing a beam from a single light source alternately to the sample under examination and to a suitable standard and then (in both cases) to a photo-electric cell. A pair of amplifiers are connected to the cell, and the amplifiers are energized in synchronism so that one amplifier is responsive to impulses generated by the light directed to the sample and the other to those from the standard.—A. P.-C.

Paper Specialties

Paper Containing Cellulose Derivatives. George A. Richter assignor to Brown Co. Brit. pat. 423,471 (Feb. 1, 1935).—Paper, *e.g.*, of high absorbing power and of high wet strength, for towels, napkins, etc., contains a hydroxy ether of cellulose, *e.g.*, methyl, propyl, butyl, etc., but particularly hydroxy ethyl ether prepared from ethylene oxide and cellulose, *e.g.*, dissolved in a 7 to 8% caustic soda solution of about 8% ether content. The cellulose hydroxy ether may be introduced at any stage of paper manufacture or subsequently thereto, *e.g.*, by adding it to pulp, impregnating and squeezing paper, spraying or by coating rolls, and may be precipitated by an acid, sodium bisulphate, alum, moist sulphur dioxide, etc. Dense paper, paper containing rosin, wax, etc., may be coated with a viscous solution of the ether, the ether may be applied along spaced intercrossing lines. Pliability may be increased by glycerine, which may be anhydrous to avoid re-drying the paper, or by polyhydric alcohols such as ethylene glycol, or by soap solutions.—A. P.-C.

Treatment of Paper. J. Halden and Co., Ltd., and J. Holden. Brit. pat. 425,215 (June 6, 1933).—Translucent fabrics (*e. g.*, tracing papers) are improved by application of a wetting agent (*e. g.*, C16-C18 saturated, unsaturated or hydroxy-unsaturated alcohols in non-aqueous solution, higher alkyl sulphates, alkylnaphthalenesulphonic acids, higher alkyl ethers of glycol or glycerol (with one free hydroxyl group), and hydroxyalkyl aromatic compounds, and a colloid (*e. g.*, starch) before, during or after treatment with medium imparting translucency. Improved inking properties are claimed.—A. P.-C.

Manufacture of Impervious Paper. Etablissements Cottereau. Brit. pat. 427,267 (Dec. 19, 1933).—Viscose is applied to both sides of the paper web by distributors exerting no pressure on it. The web travels freely for natural capillary impregnation, and is then pressed between rolls to remove excess viscose. After travelling freely again to assume its original thickness and to distribute absorbed viscose uniformly, the web is immersed in viscose-coagulating baths, washed and dried.A. P.-C.

Production of Mica-Covered Papers. H. R. Ruggles-Brise. Brit. pat. 426,191 (Nov. 21, 1934).—The paper is coated with a thin layer of adhesive such as paper size, and sprayed automatically with mica flakes before the size dries.—A. P.-C.

Manufacture of Strengthened Absorptive Paper. Milton O. Schur assignor to Brown Co. U. S. pat. 2,005,397 (June 18, 1935).—Absorptive paper, such as toweling, is treated with a wet strengthening agent such as viscose, glue, gelatin, etc., a wetting-out agent such as "Nekal A," "Indrapid," "Neomerpin," etc., the function of the wetting-out agent being to prevent reduction of absorptiveness.—A. P.-C.

Decorative Paper. John H. Gibbs assignor to Denison Manufacturing Co. U. S. pat. 2,007,047 (July 2, 1935).—Crepe paper is ribbed or corrugated in a direction approximately at right angles to the creping.—A. P.-C.

Laminated Cellulose Unit and Process of Making Same. Irving F. Laucks assignor to I. F. Laucks, Inc. U. S. pat. 2,001,276 (May 14, 1935).—Cotton linters, sulphite pulp, or other cellulosic material is treated with an oxidizing agent to convert it into "oxycellulose"; the latter is treated with caustic soda and carbon disulphide to convert it into "oxycellulose viscose," which is used as an adhesive for plywood.—A. P.C.

Fiber Article. Harold W. Greider and Marion F. Smith assignors to The Philip Carey Manufacturing Co. U. S. pat. 2,006,392 (July 2, 1935).—A sheet suitable for making into articles such as pie plates consists of an upper ply or liner, made of sulphite pulp and treated with casein, glue, rubber latex, etc., together with a waterproofing compound such as stearic acid, which upper ply is applied to a lower or base ply made of a mixture of asbestos or other mineral fibers and kraft pulp and impregnated with sodium silicate.—A. P.-C.

Finishing Room Problems. J. G. Weiner. Paper Industry 17:327-328 (Aug., 1935).—An account of personal findings and experiences as boss finisher in a book, bond, writing, offset and specialty mill—A. P.-C.

Art of Producing Multilateral Stretchability in Paper Webs. William C. Kemp assignor to The Paper Service Co. U. S. pats. 2,008,181 and 2,008,182 (July 16, 1935).—The invention consists in producing crossing sets of diagonal creping crinkles in a paper web. The web is bound to a moving creping surface in any suitable manner and is removed therefrom by means of a creping doctor. The creping surface may be made to move in a substantially flat plane, or it may consist of a cylinder. In the latter case the doctor may consist of a straight knife set at an angle to the axis of the cylinder and hollowed out

to contact with the cylinder, or it may consist of a flexible metal band having a helical contour to conform to the surface of the cylinder. No. 2,008,181 covers the apparatus and No. 2,008,182 the method.—A. P. -C.

Manufacture of Vulcanized Fiber. John K. Anthony assignor to Horace B. Fay. U. S. pat. 2,008,432 (July 16, 1935).—Tendency to distortion of the finished product is obtained by subjecting the sheet to the action of the vulcanizing agent (zinc chloride solution, sulphuric acid) for a sufficient length of time to obliterate fibrous structure.—A. P. -C.

Process and Machine for the Manufacture of Paper Tubes. René Jarrier assignor to Bartlett Arkwell. U. S. pat. 2,008,717 (July 23, 1935).—The machine is chiefly characterized by the fact that a tube consisting of several convolutions of paper impregnated with a suitable waterproofing agent is subjected to this impregnation only in certain suitably spaced regions, and also that, in addition to the pasting device, it comprises an impregnating device that is operated in synchronism with the other movements of the machine.—A. P. -C .

Paper and Process of Making It. George L. Bidwell assigned to Riegel Paper Corp. U. S. pat. 2,011,609 (Aug. 20, 1935).—Paper having a surface that slips readily on a similar surface is produced by impregnating partially dried paper containing 70 to 75% moisture with melted paraffin wax at about 160° to 210° F., and when further dried but still retaining some 60 to 68% moisture, impregnating with a plasticizer such as an aqueous solution containing glycerin, cerelose and sodium meta-silicate.—A. P. -C.

Paper As an Insulator. C. F. Hill. Paper Industry 17:161-163 (June, 1935).—A discussion giving a general idea of the use of paper in electrical insulation.—A. P. -C.

Stencil Sheet and Method of Making the Same. Louis G. Brandt assignor to The Multistamp Co., Inc. U. S. pat. 2,004,484 (June 11, 1935).—Yoshino paper is coated with a composition comprising coagulated, water-resistant gelatin, soap, and a mixture of an oil and glycerin in substantially equal parts, the proportion by weight of the soap being over three times that of the gelatin, and the proportion by weight of the oily mixture materially exceeding that of the soap.—A. P. -C.

Decalcomania Paper. Henry Atwater assignor to McLaurin-Jones Co. U. S. pat. 2,007,630 (July 9, 1935). —The rear surface of the backing sheet is embossed with some design that produces a multiplicity of raised portions distributed substantially uniformly over the surface of the sheet, with intervening lower areas. This can be effected by running the sheets of paper, either before or after gumming, between a smooth roll that engages the front face of the sheet and an engraved roll that engages the rear face.—A. P. -C.

Stencil. Robert O. Williams assignor of one-third to Owen E. Williams and one-third to William A. Harvey. U. S. pat. 2,007,783 (July 9, 1935).—A stencil coating is prepared by adding with stirring two parts of dibutyl phthalate to 5 parts of triacetin and adding the mixture to 12 parts of copal gum solution.—A. P. -C.

Decalcomania Paper. John MacLaurin. U. S. pat. 2,007,404 (July 9, 1935).—The rear surface of the backing sheet is roughened by spraying particles of some material upon it that sticks to the paper but does not have any great degree of adhesion for the printing ink. A suitable preparation consists of a filler (chalk, talc, etc.) dispersed in a solution of an inexpensive gum (dextrin or starch.)—A. P. -C.

Mottled Paper. Olof H. Hedstrom, Jr. Brit. pat. 426,303 (April 1, 1935).—A pair of parallel troughs containing differently colored solutions are mounted transversely and slightly above the wire of a fourdrinier machine. Each trough is provided with a rotating shaft on which are mounted prongs or fingers of various lengths, so that rotation of the shaft throws out drops of liquid to different distances. The two shafts are rotated so as to throw the liquids towards each other, the troughs are located and the speed of the shafts adjusted so that a certain amount of the drops from both troughs will hit and intermingle with each other in the air before they fall on to the moist web on the wire.—A. P. -C.

Creped Tissue Paper. Charles M. Howell and James d'A. Clark, assignors to Scott Paper Co. U. S. pat. 2,001,023 (May 14, 1935).—The invention consists in a single-ply creped paper towel or toilet tissue, of basis weight of 12 lbs. or over per 3,000 sq. ft., having a potential stretch of not less than 15%.—A. P. -C.

Method and Means for Compounding Flame and Waterproofing Compositions for Aqueous Cellulosic Media. Frederick W. Hochstetter assignor to Treesdale Laboratories, Inc. U. S. pat. 2,003,148 (May 28, 1935).—In 640 parts of water at 120° F. are dissolved successively with continuous stirring 48 parts of ammonium sulphate and 16 parts of ammonium carbonate; a solution of 20 parts of boric acid in 128 parts of boiling water are added, and then in turn 16 parts of borax, 16 parts of starch cooked to about 1° Baumé, and 6 parts of soap previously dissolved in 128 parts of boiling water. The whole is digested for 2 hours at 110° F. and constitutes solution *A*. In 640 parts of boiling water are dissolved successively with stirring 80 parts of ammonium chloride, 48 parts of boric acid and 16 parts of borax; a solution of 32 parts of soft gelatin in 256 parts of water at 200° F., with or without 13.5 parts of glycerin, is added, followed by a solution of 3 parts of soap and 8 parts of dextrin in 128 parts of boiling water. This constitutes solution *B*. Solution *C* consists of a filtered solution of 15 parts of soap bark dissolved in 128 parts of boiling water, and solution *D* is prepared by dissolving 32 parts of alum in 256 parts of water. *A*, *B* and *D* are combined together, and *C* is added with vigorous stirring. The solution is used to impregnate paper to render it water- and flame-proof. —A. P. -C.

Sheet Material for Curing and Protecting Concrete and Method of Making Same. Edward H. Angier. U. S. pat. 2,003,988 (June 4, 1935).—The invention provides a protective mat, *e. g.*, of waterproof material such as burlap united with paper and treated with asphalt, and having holes or openings to permit water to flow through for further moistening of the concrete or for the escape of excessive heat.—A. P. -C.

Coated Paper. International Latex Processes, Ltd. Brit. pat. 425,941 (March 25, 1935).—Paper is coated with a composition comprising an adhesive, *e. g.*, casein, starch, glue, albumin, shellac, rubber solids of an aqueous rubber dispersion, mineral material, *e g.*, china clay, satin white, blanc fixe, Paris white, forming more than 50% of the total solids, and a non-colloidal polyhydroxy aliphatic hygroscopic agent, *e. g.*, ethylene glycol, diethylene glycol, triethanolamine. The coating may be vulcanized after application or a vulcanized latex may be used.—A. P. -C.

Carbon Paper. Martin Bandli. Brit. pat. 424,495, (Feb. 15, 1935).—Carbon papers are made by mixing cellulose derivatives with dyes dissolved in oleic acid or fats and absorbent fillers such as carbon black, and mixing the paste thus obtained with a solution of a substance which acts as an insulating substance for the oleic acid or fat

and which, in the dissolved state, is not soluble in the oleic acid or fat used or in the solvent or plastifiers of the cellulose derivative used. Such insulating materials include viscose, glucose, cellulose ethers, cellulose xanthate insoluble in acetone, cellulose nitrates soluble in alcohol, alkali silicates, agar-agar, gelatin, glues and resins.—A. P. -C.

Paper Containing Hydrated Cellulose. Harry H. Nelson and Guillaume Becker. Brit. pat. 425,666 (March 19, 1935). Addition to 410,310.—To a freshly prepared, highly viscous solution of cellulose thiocarbonate, just enough coagulant is added to precipitate hydrated cellulose which is thixotropic, and to discharge electrically the aggregates of the colloid, the cellulosic substance, before or after precipitation, being added to paper pulp to produce waterproof paper, etc. As coagulant there is used a solution of 0.2 g.-mol. each of sulphur dioxide and sodium sulphite per 1., or dilute acids such as acetic, sulphurous, hypochlorous, hydrochloric and (or) sulphuric. The solubility of the colloid is destroyed on dehydration by drying, or by a dehydrating agent, *e. g.*, an acid, alcohol, formol or tannin, strong translucent webs repellent to water, oils, petroleum, etc., being obtained. The process may be combined with sizing by resin or paraffin, and pliability of the web may be obtained by adding soap, glycerin or glucose during or after manufacture, *e. g.*, by incorporation in thethioxtrope. A paper web obtained as described may be united with paper or cardboard to form waterproof board.—A.P.-C.

Sheets of Hydrated Cellulose. La Cellophane. Fr. pat. 779,183 (March 30, 1935).—Sheets of stable dimensions are obtained by subjecting the sheets to variations of temperature in a package proof against moisture, while they are in the form of a continuous band of sheets cut to shape. A roll with expanding surface for the continuous bands is described.—A. P. -C.

Production of Durable Horn Like Material. F. S. Duncan. Brit. pat. 429,523 (Jan. 29, 1934).—A paper web is impregnated by immersion in or spraying with a solution of colloidal protein matter (glue, casein, etc.), and wound on a forming roll; the laminated roll is treated with cold aqueous alum, tannin, or formaldehyde solution to gell and fix the protein, and is finally dried.—A. P. -C.

Paper Suitable for Corrugated Portions of Shipping Containers. Hinde and Dauch Paper Co. Brit. pat. 425,802 (March 21, 1935).—The paper is formed of mixed stock such as is used in the manufacture of so-called "chip paper" and having in the manufactured products an alkaline reaction.—A. P. -C.

Building Plates. Fibroplast A.-G., and Alfred Wilke. Brit. pat. 424,179 (Feb. 15, 1935).—Building-plates made from woody or other fibrous material admixed with an aqueous emulsion of bitumen or other waterproofing material are washed with water during manufacture to remove the bitumen from the superficial fibers so that the plates do not adhere to the machine which subsequently presses them so that, when dried, they afford a surface for plaster or oil colors.—A. P. -C.

Process for the Production of Hollow Forms from Paper Stock. B. Nylander, Forshaga, Sweden. Finn. pat. 16,232 (Feb. 22, 1933).—J. F. O.

Playing Card Board. H. Postl, Vienna. Wochbl. Papierfabr. 66, No. 14:268 (April 6, 1935).—Short description of the origin of playing cards and the important points of its manufacture.—J. F. O.

Process for the Manufacture of Plastic Objects Through the Use of Cellulose Compounds Obtained from Wood. Zellstoffabrik Waldhof, Mannheim. Swed. pat. 82,252 (April 26, 1933).—Pulp made from the alkaline process is converted into cellulose compounds and mixed with a plasticizing material.—J. F. O.

Process and Device for the Production of Carton. C. A. Andersson, Lillehammer, Norway. Swed. pat. 82262 (Feb. 27, 1928).—The carton is made from several layers of stock, the outer layers made on a fourdrinier machine while the inner layers are made on cylinder machines.—J. F. O.

Process for the Manufacture of Art Objects by the Use of Products Obtained from Viscose. L. Lienfeld, Vienna. Finn. pat. 16,113 (March 15, 1933).—J. F. O.

Process for the Production of Paper and Board. Egon Elod. Karlsruhe. Ger. pat. 611,079 (April 22, 1931).—Pulp is mixed with from 5 to 20 per cent of the chrome leather waste parings which are first treated in a rod mill. The fat content of the leather parings should not exceed 3 per cent after treatment.—J. F. O.

Decorated and Saturated Floor Covering. Ralph G. Jackson and Julian T. Baldwin. U. S. pat. 2,011,150 (Aug. 13, 1935).—Absorbent sheets such as porous paper are printed with a design in such a manner that the design penetrates a substantial depth into the body of the sheet. It is then impregnated with a transparent saturant having as its two major ingredients a resin and a substantially chemically stable plasticizer (*e. g.*, dibutyl phthalate, diamyl phthalate, dibutyl tartrate, triphenyl phosphate or tricresyl phosphate).—A. P. -C.

Bendable Laminated Product Suitable for Use in Furniture Manufacture. Gustav E. Landt assignor to Continental-Diamond Fibre Co. U. S. pat. 2,003,752 (June 4, 1935).—A material which withstands bending without cracking or delamination comprises fibrous sheet material such as canvas or paper impregnated with a thermoplastic resin such as an aniline-formaldehyde resin and united with a metal sheet such as steel, iron, nickel, copper, zinc, aluminum, etc.—A. P. -C.

Sheet Material Suitable for Electrical Insulation. Willard P. Worrell and Francis E. Gruber assignors to Western Electric Co. U. S. pat. 1,998,827 (April 23, 1935).—Sheet material such as paper impregnated mainly with a phenol resin is united by heat and pressure with another sheet of material formed of or impregnated with a mixture of a cellulose derivative such as cellulose acetate and a phenol resin.—A. P. -C.

Composite Matrix for Printing Plates. Gunnar Rosenqvist. U. S. pat. 1,997,875 (April 16, 1935).—A composite matrix for making electro-type plates comprises alternate relatively thin layers of fibrous sheet material and plastic material assembled to constitute a unitary structure.—A. P. -C.

Friction Facing Material. William R. Seigle assignor to Johns-Manville Corp. U. S. pat. 2,011,915 (Aug. 20, 1935).—A sheet or slab adapted for use as friction facing material is composed of a mixture of asbestos fibers, a colloidal rubber emulsion and a friction augmenting material such as metal chips, filings or dust, gilsonite, asphalt, copal gum, cement, graphite, carbon black, drying oils, sulphonated oils, etc.—A. P. -C.

Apparatus for Making Plyboard. Arthur G. Leonard, Jr., assignor to Orenda Corp. U. S. pat. 2,010,308 (Aug. 6, 1935).—In the manufacture of asbestos shingle stock and similar material by accumulation of successive layers on a roll, the material is cut during every revolution of the roll by means of two knives inside the roll, carried by a chain which is so geared to the roll that during each revolution one of the knives makes a stroke across the width of the roll, neither of the knives being in a cutting position as they pass the bottom of the roll. Stripping of the material is initiated by means of compressed air which

is blown through a line of holes adjacent to the cut, and completed by gravity.—A. P. -C.

Method and Apparatus for Making Insulating Board. David H. Patterson, Jr. U. S. pat. 2,011,183 (Aug. 13, 1935).—A cementitious filler is applied to a single-faced corrugated sheet, a second single-faced corrugated sheet is applied so that the filler lies between the two corrugated sheets. The united sheet is passed through a press that reduces it to a predetermined thickness, after which the filler is allowed to set, and the web is cut into sheets of desired length and dried.—A. P. -C.

Method of Making Corrugated Board. David Weber assignor to David Weber and Co. U. S. pat. 2,008,974 (July 23, 1935).—Double-walled corrugated board is formed by applying paste to the exposed ridges of a continuously fed single-faced corrugated board, successively feeding preformed sheets of double-faced corrugated board into contact with the previously gummed ridges so that the two sets of corrugations are at right angles to each other, pressing the combination, drying and cutting transversely.—A. P. -C.

Paperboard Manufacture. Arthur R. Harvey assignor to The Gardner-Richardson Co. U. S. pat. 2,007,470 (July 9, 1935).—An inner layer of fibrous material of medium grade, *i. e.*, of a better grade than the main body but inferior to the fibrous material used as top liner, is applied directly to the travelling filler web. The sheet is passed over a roll which applies a light-colored coating, *e. g.*, of clay, mixed with a suitable adhesive. A second or outer liner of higher grade fibrous material is applied directly over the coating.—A. P. -C.

Method of and Apparatus for Making Paperboard. John D. Tompkins. U. S. pat. 2,007,551 (July 9, 1935).—On leaving the last cylinder mold the felt with adhering web of board is passed around a suction roll and then under a series of elements that radiate heat on the web. Suction boxes are provided under the web approximately opposite the heating elements.—A. P. -C.

Fire Resisting Paper or Board. John Fletcher assignor to Plastergon Wall Board Co. U. S. pat. 2,010,015 (Aug. 6, 1935).—Paper or board is impregnated with a chlorinated diphenyl resin, with or without preliminary or subsequent treatment with dilute sodium silicate solution. —A. P. -C.

Manufacture of Paper and Board Having Properties Similar to Vulcanized Fiber. Arthur Janser. Fr. pat. 781,763.—Paper and relatively thick board having properties similar to those of vulcanized fiber are produced by adding to the stock in the beater the reaction products of the alkaline, acid, oxidation or esterification treatment of starch, and precipitating by addition of a suitable electrolyte such as aluminum sulphate and (or) iron sulphate.—A. P. -C.

Manufacture of Fiber Boards and Like Products. W. W. Triggs, assignee of Masonite Corp. Brit. pat. 426,817 (Nov. 4, 1933).—Hard fibrous board, which has been dried under pressure after formation on the machine, is impregnated with 4% of tung oil (or other drying agent) and about 2% of a hydrocarbon waterproofing agent. It is then baked at 93° C. in presence of air for less than 7 hours. Alternatively, the tung oil and hydrocarbon may be added either directly to the slush pulp or partly to the pulp and partly to the dried board.—A. P. -C.

Fiber Building Boards. Charles G. Weber. Ind. Eng. Chem. 27:896-898 (Aug., 1935).—A brief description of their manufacture and use.—A. P. -C.

The World's Largest Board Machine. R. J. Spencer-Phillips. Pulp Paper Can. 36:335-336 (June, 1935).—A description of the 8-vat, 180-inch board machine recently installed at the Thames Board Mills Ltd., Purfleet, England.—A. P. -C.

Experimental Production of Fiberboard for Use in High-Tension Oil Transformers. B. N. Moiseev. Bumazhnaya Prom. 14, no. 3:42-57 (March, 1935); C. A. 29:5268.—The usual procedure of manufacture is described. The fiberboard was obtained from uncooked new calico waste trimmings and from the same material cooked with 0.5% sodium hydroxide (on the weight of air-dry trimmings) at one atmosphere pressure for 3 hours, followed by washing at 70° for one hour. In each case the material was washed (the cooked mass until free from sodium hydroxide) and beaten to 45-55° freeness. The cooked product resulted in a fiberboard comparable in every respect to the foreign products.—C. J. W.

Water Sorption of Electroinsulating Fiberboard. K. F. Gustav. Bumazhnaya Prom. 14, no. 3:58-64 (March, 1935); C. A. 29:5269.—Fiberboard obtained from uncooked calico waste shows a sharply defined capillary and microcapillary porous structure. With the increasing degree of beating the microcapillarity decreases but at 65° freeness it is greater than that of the fiberboard obtained from the cooked trimmings of the same freeness. Cooking with sodium hydroxide reduces somewhat the microcapillarity hygroscopicity of the resulting fiberboard but at the same time it facilitates the formation of hydrated cellulose in the process of beating. Its microcapillary porosity is practically destroyed by beating, the process of water absorption being effected almost exclusively by the swelling of the amorphous mass formed in the process of beating. The hygroscopicity of the fiberboard obtained from the uncooked trimmings at 45° freeness is greater than that of the board obtained from the cooked stuff of the same degree of freeness; the same is true of the products beaten to 65° freeness, where, besides the swelling of the amorphous mass, a condensation of moisture in the micropores, not yet destroyed by the beating, takes place. The experiments show that there is no relation between the moisture sorption, *i. e.*, the hygroscopicity of a fiberboard and its ability to absorb water on contact with it. Thus, with the greater beating the power of absorption of a fiberboard sharply decreases; while its hygroscopicity increases.—C. J. W.

Process and Device for the Working of Pulp and Ground Wood into Sheets. A. Bol. Sundsvalls Forenade Verkstader, Sundsvall, Sweden. Finn. pat. 16,186 (Sept. 27, 1933).—J. F. O.

Paper Windows Which Are Permeable to Ultra Violet Light. Wochbl. Papierfabr. 66, No. 27:515 (July 6, 1935).—It has been proven that paper impregnated with animal or vegetable oils will permit a high percentage of ultra violet rays to pass through so that paper may be now substituted for the more expensive glass in hospitals and places where the rays will be beneficial.—J. F. O.

Process for the Manufacture of Paper of Required Thickness Across Its Entire Width on the Paper Machine. Otto Gunther, Papierfabrik, Greiz Ger. pat. 607,011 (June 21, 1929).—The paper while it is still in a soft and pressable condition is passed through calibration rolls which are placed between the last press and the dryers.

Mottled Paper. Erich Friedrich. Wochbl. Papierfabr. 66, No. 19:361-62 (May 11, 1935).—The raw materials used, their preparation and application are discussed.—J. F. O.

Manufacture, Properties and Working of Hard Paper. Burgel. Zellstoff Papier 15, No. 2:59-62; No. 3:102-03 (Feb., March, 1935).—The hard paper is made by treating certain grades of paper with condensation products using

either phenol as base or urea. The manufacture with each is briefly described, as well as its working and uses.—J. F. O.

Aniline Printing Machine in the Paper Mill. Wochbl. Papierfabr. 66, No. 13:247-48 (March 30, 1935).—Description of a certain machine for the printing of designs on paper.—J. F. O.

Raw Materials for Paper. Zellstoff Papier 15, No. 5:203-205 (May, 1935).—Ways and means for making paper hard, white, resistant to inks, specific weight higher or lower, transparency and the physical strength test desired are discussed.—J. F. O.

Process for the Manufacture of Carbon Paper. Caribonum Ltd., London. Ger. pat. 611,389 (July 7, 1931).—J. F. O.

Paper Specialties

Copper Plate Printing Paper. Papier-Ztg. 60, no. 49:852 (June 19, 1935).—The copper plate printing process requires a very absorptive paper made from naturally absorbent and elastic fibers. Cotton, with an addition of soft linen rag pulp, is the most suitable raw material for the higher grades; hard linen rags must be softened by appropriate cooking. Coniferous chemical pulps, straw and groundwood pulp are not suitable, whereas aspen, beech and alpha pulps can be utilized for the cheaper grades. Neither sizing nor filler agents should be used for the better classes of the paper; special attention must be paid to the elimination of even minute metallic particles. The beaters should be equipped with narrow and not too blunt knives and should yield a free pulp. Pressing on couch and wet presses must be slight so as not to impair the absorptiveness of the fibers; the efficiency of the dryer part must consequently be high. The paper is always manufactured in sheets, never in rolls; even nowadays it is often made by hand.—C. J. W.

Lamp Shade Paper and Foils. Papier-Ztg. 60 no. 55:951 (July 10, 1935).—Lamp shades are usually made from oil-impregnated carton with mottled or embossed design. Special effects can be obtained with lacquers, hand painting or transfer pictures. The latest innovation in this field are shades made from multi-colored cellulose acetate waste.—C. J. W.

Safety Paper. John W. Neff assignor to Milton C. Johnson Co. Can. pat. 350,112 (May 7, 1935).—Thionated condensation products of para-toluidine, the simplest of which is dehydrothio-para-toluidine, or higher members of the series containing three or four more benzene rings, as well as salts of their sulphonic acids and cobalt ferricyanide are incorporated in paper to make it sensitive to oxidizing or bleaching agents. Calomel, copper sulphate, copper oxalate or bismuth nitrate make paper sensitive to reducing agents.—A. P. -C.

Safety Paper. E. I. du Pont de Nemours & Co. Bris. pat. 423,046, (Jan. 24, 1935).—Paper, parchment, etc., for checks, deeds, etc., is made sensitive to ink-eradicating chemicals by incorporating with the paper pulp in the beater, or by adding to the paper, in solution or in suspension with sizing materials, or by dipping, or during calendering, an aminoarylothiazole or a salt thereof.—A. P.-C.

Safety Paper. Oskar C. Recht. Brit. pat. 423,281, (Jan. 29, 1935).—Paper for paper money, etc., has fibers of a different nature, or disposed differently, from those of the bulk of the paper to produce a characteristic surface and (or) edge structure perceptible by touch. The fibers, *e.g.*, of cellulose, flax, hemp, silk, rayon, cotton or wool, may be partly embedded into an incompletely felted pulp web on the paper machine wire.—A. P.-C.

Safety Paper. John W. Neff assignor to Milton C. Johnson Co. U. S. pat. 2,005,105 (June 18, 1935).—Suitable markings are printed on the paper with a substantially invisible cobalt ferrocyanide ink.—A. P.-C.

Safeguarding Document Papers Against Falsifications. V. T. Bausch. Papier-Ztg. 60, no. 46/47:811-812 (June 8, 1935).—Safety paper should be slack-sized, just sufficiently to allow the writing ink to penetrate almost to the opposite side of the sheet without spreading or striking through. Heavier grades of paper should be employed. All chemical eradicators, acids, alkalis, oxidation or reducing agents should cause a decided color reaction which is darker than the surrounding paper and which cannot be removed by any compensating agent, at least not without leaving a noticeable stain.—C. J. W.

Insulating or "Fish" Paper and Method of Making. James L. McLellan assignor to Hollingsworth and Vose Co. U. S. pat. 2,008,141 (July 16, 1935.—Electrical insulating paper having high dielectric strength and high mechanical strength is produced from Manila hemp or sisal fibers by forming the latter into an absorbent sheet and subjecting it to parchmentizing by means of sulphuric acid or zinc chloride solution.—A. P.-C.

Imitation Leather. George L. Schwartz assignor to E. I. du Pont de Nemours and Co. U. S. pat. 2,011,914 (Aug. 20, 1935).—Paper is made of a mixture of fibers which are capable of being gelatinized or rendered adhesive (*e.g.*, nitrocellulose) and of ordinary paper making fibers, and is treated with a gelatinizing or softening agent to make the gelatinizable fibers adhere to the other fibers (*e.g.*, treated with a nitrocellulose solvent to gelatinize or swell the fibers, but not dissolve them).—A. P.-C.

New Processes for the Manufacture of Pulp Wadding and Water-proof Products of Pulp. A. Foulon. Wochbl. Papierfabr. 66, No. 19: 362-64 (May 11, 1935).—Several of the more important patents from various countries concerning processes for the manufacture of pulp wadding and water-proof products from pulp are briefly described. —J. F. O.

Waterproof Paper. Harry H. Nelson and Guillaume Becker. U. S. pat. 2,011,156 (Aug. 13, 1935).—Waterproof paper of high strength is obtained by moistening a web of paper with a dilute solution of cellulose thiosulphocarbonate, impregnating with a solution of freshly prepared cellulose thiosulphocarbonate and precipitating hydrocellulose by means of a coagulant of viscose of weak acidity. The impregnating thiosulphocarbonate is prepared from alkali cellulose obtained by treating cellulose with 18% caustic soda at or below 0° C.—A. P.-C.

Absorbent Paper. Vanderveer Voorhees. U. S. pat. 2,004,143 (June 11, 1935).—An absorbent paper towel is treated in a restricted area with a water resistant size to provide a grip which will retain its tensile strength when seized with wet hands.—A. P.-C.

Moistureproofing Fiber Containers. Francis P. McColl. U. S. pat. 2,008,218 (July 16, 1935).—The wall of the container is formed from a flexible sheet of fibrous material by applying to opposite ends or opposite sides thereof sheets of substantially non-porous and preferably transparent material, rolling one end within the other and securing the free ends of the applied sheets together.—A. P.-C.

Method of Manufacturing Wetproof Cellulose Products. Julius Kantorowicz. U. S. pat. 2,010,635 (Aug. 6, 1935).—"Raw cellulose" is waterproofed by treating with a mixture of 100 parts of 40% formaldehyde and 2 parts of concentrated nitric acid and drying at 120° C. on a heated support. Towelling having suitable absorptiveness and retaining its strength when wet is made from a

furnish composed of 4 parts of waterproofed pulp and 1 part of untreated pulp.—A. P.-C.

Waterproofing Paper. Bernard H. Gottereau. Fr. pat. 779,039 (March 28, 1935).—Paper is coated with viscose which is afterward coagulated.—A. P.-C.

Waterproof Paper. International Latex Processes, Ltd., Clifford S. Johnson inventor. Fr. pat. 779,205 (April 1, 1935).—Paper is made resistant to water and grease by coating the surface with solids deposited from an aqueous dispersion of rubber and then applying a coating of lacquer, *e.g.*, a resin or nitrocellulose lacquer.—A. P.-C.

Swelling of Cellophane in Water. A. A. Morozov. J. Applied Chem. (U. S. S. R.) 7:1230-1240 (1934); C. A. 29:5652.—A cellophane prepared from a viscose which was aged in water only for 2 days increased its weight at 25° by 50%, while viscose films which were aged for 12 days by swelling under the same conditions absorbed 70% calculated on the dry weight of the cellulose. The swelling of Cellophane is lowered on repeating the operation. One third of the water adsorbed by Cellophane combines chemically with the latter.—C. J. W.

Production of Pergamyn from Bleached and Unbleached Pulp. Khodakov and Nikonova. Bumazhnaya Prom. 14, no. 4:67-69 (April, 1935); C. A. 29, 5266.—Factory experience showed that the transparency and the resistance to breaking of pergamyn suitable for reworking into tracing paper increases with increasing hardness of the bleached pulp used in its production. A pergamyn produced from unbleached pulp has a high degree of resistance to breaking. The object of the experiments was to obtain a pergamyn possessing the necessary physical properties together with a satisfactory whiteness. Tests with pulps at 75° and 90° hardness (Bjorkman) produced poor results. The best results were obtained with a pulp of 108-112° hardness by bleaching with 6.85% of active chlorine for 3 hours to 53° hardness, beating for 30 minutes in a Voith beater and brushing for 7.5 hours to 84° freeness.—C. J. W.

Embossing Paper, Crayon and Boards. Papier-Ztg. 60, no. 56:967-968 (July 13, 1935).—Different methods of relief printing are described.—C. J. W.

Fire-Resistant Papers. Papier-Ztg. 60, no. 43:768 (May 29, 1935).—The article emphasizes that it is impossible to make paper fireproof which consists entirely or essentially of cellulose. The inflammability can only be retarded but never entirely suppressed. A brief review is given of different agents and procedures for making paper fire-resistant.—C. J. W.

Carbon Papers. R. Rau. Papier-Ztg. 60, no. 41:736-737 (May 22, 1935).—Brief reference is made to the manufacture of the various types of carbon papers for pencil or typewriter. Strong thin tissue paper is coated on one or both sides with a mixture of carbon and some waxy medium; the manufacture requires skill and experience. A number of coating compositions in different colors are listed.—C. J. W.

Method of and Apparatus for Treating Shingle Elements. Jules L. Wettlaufer assignor to The Patent and Licensing Corp. U. S. pat. 2,011,098 (Aug. 13, 1935).—The invention provides a method and a machine for applying a sealing coat of bitumen to the cut edges of composition shingles or shingle strips, and for applying a supplementary coating on one or both sides of the butt end to thicken the latter, and also a layer of grit surfacing on the coated butt end.—A. P.-C.

Method of Preparing Roofing Granules. Stephen G. Wright. U. S. pat. 2,010,620 (Aug. 6, 1935).—Glazed roofing material is prepared by admixing flakes of slag with a pigment, powdered glass and a glue (*e.g.*, sodium silicate) to make the pigment and powdered glass adhere to the flakes, and then heating the mixture to a fusion temperature whereby the glass particles form about the flakes a glaze in which the pigment is embedded.—A. P.-C.

Asphalt Coating Material. Wallace A. Craig and Fred E. Griffith assignors to William C. McDuffie, receiver for Richfield Oil Co. of California. U. S. pat. 1,997,569 (April 16, 1935).—A material suitable for use in the manufacture of roofing felt comprises uniformly oxidized asphalt-base petroleum oil residium containing a finely divided clarifying and decolorizing agent such as spent hydrated magnesium silicate distributed throughout the mass and bonded to the residuum by a film of polymerized hydrocarbons derived from a petroleum oil distillate. The composition is produced by oxidizing asphalt-base petroleum residuum, mixed with the other material, with air at about 200° to 290° C.—A. P.-C.

Roofing Product. Thomas Robinson assignor to Lancastor Asphalt Inc. U. S. pat. 2,003,699 (June 4, 1935).—A roofing element consisting of a platelike body of hardened plastic material (preferably a bituminous material), stiffened and strengthened by the addition of a suitable filler (preferably of fibrous character), has its sides and butt edge undercut. A stiffening rib formed in the body of the plastic material extends transversely of the body along the butt edge and on one surface only of the element, and on the same surface there is applied a reinforcing web of material (*e.g.*, a light weight felt) extending from the stiffening rib to slightly beyond the center of the element.—A. P.-C.

Method of Artificially Coloring Roofing Granules. Stephen G. Wright. U. S. pat. 2,004,682 (June 11, 1935).—Rock particles for surfacing composition roofing are colored by mixing them with finely ground "Cullet" (waste broken glass) which is mostly of low melting-point, with a certain proportion of high melting-point; an adhesive (*e.g.*, sodium silicate) and a suitable pigment (*e.g.*, chromium oxide) are added and the mixture is heated to about 1500° F.—A. P.-C.

Machinery

The Debit and Credit Sides of Wood Barking in the Forest. E. W. Ronge. Svensk Pappers-Tidn. 38, No. 9:283-286, 289-290 (May 15, 1935).—After a detailed consideration of all the factors involved, the author arrives at 10-15 per cent higher cost figures for wood barked in the forest as compared to mill barked wood. Sawmill timber should be floated in non-barked condition and kept in the water until fall unless water showers or sprays are available, in which case it can be stored on land in spring. It should be barked before being admitted to the sawmill, all wood waste being collected for the sulphate mill. Sulphite wood should be floated in unbarked condition and stored in water. After bringing to shore it should be rough-barked and allowed to dry in a store room. When needed in the mill it should be cut to required size and washed free from adhering bark residues and impurities in barking drums. Sulphate wood should be made up chiefly of those wood species which on account of sinkage have to be barked in the forest. Otherwise a rough barking in the mill is all that is required.—C. J. W.

The Barking of Wood. Zellstoff Papier 15, No. 3: 95-96 (March, 1935).—The cost of barking wood in U.S.S.R. was worked out for 12 different methods and apparatus, including hand barking, knife, Thorne and several

types of barking drums. A Hellner barking drum was the cheapest, barking one solid cubic meter of wood for 18.8 rubles, other barking drums were as high as 45.1; the Thorne barker did the job for 26.0; the best knife barker was 32.5 and for hand barking the cost was 87.2. The length of the barking season had much to do with the cost of barking with the various types.—J. F. O.

Device for the Conveying of Logs to the Barking Drum. A. G. Johannsson and S. Bergstrom, Stocksund. Swed. pat. 82,216.—J. F. O.

Apparatus for Removing Bark from Logs. Frederick A. Nicholson and Wilmot T. Pritchard assignors to Stetson-Ross Machine Co. U. S. pat. 2,005,799 (June 25, 1935).—The invention provides novel means for supporting and adjusting to various operative positions a rotative cutter-head, so as to adapt its curved surface and the correspondingly curved cutting edges of the knives which it carries to conform to the surface of the log. It also provides various new features in the design of the log supporting and advancing mechanism.—A. P.-C.

Rotary Wood-Chipping Machine. Walter I. Brown. U. S. pat. 2,004,367 (June 11, 1935).—Blocks of wood supported in suitable hoppers are divided into uniform chips by passing under the hoppers series of slitting cutters which cut vertically into the blocks to a definite depth, each series of slitting cutters being followed by a shearing knife which cuts off the slit portions of the wood.—A. P.-C.

"Hochst" Acid Cement and "Asplit" in the Pulp Industry. Dietz. Papier-Fabr. 33, No. 20:172-74 (May 19, 1935).—Generalizations regarding pulp digesters cements and mortars, in particular "Hochst" acid cement for the backing and "Asplit" for the joints between the bricks. —J. F. O.

Horizontal Revolving Digester with Forced Liquor Circulation. W. Schmid, Papier-Fabr. 33, No. 24:206-07 (June 16, 1935).—Description of a system of forced circulation of cooking liquor for horizontal revolving digesters protected by Swedish patents numbers 81,615 and 81,616.—J. F. O.

Method for Filling Digesters. Papier-Fabr. 33, No. 18; 158-159 (May 5, 1935).—By means of sketches, the Svensson digester filling apparatus which uses steam, is described.—J. F. O.

Interesting Suggestion for a Digester Filling Device. Finnish Paper and Timber J. 17, No. 4:150, 152 (Feb. 28, 1935).—This is a discussion of an article by Khodakov (Bumazhnaya Prom. 13, No. 8:51 (1934)), in which digester filling devices for the simultaneous charging of chips and liquor are described. A better packing of the chips and consequent increase of the capacity of the digester are claimed for the installation.—C. J. W.

Corrosion of Welded Seams in Sulphate Cellulose Digesters. V. I. Naumov. Khim. Mashinostroenie 1935, No. 2:18-22; C. A. 29:6196.—Seams were welded electrically, annealed for one hour at 900-950°, cooled quickly to 700° and finally cooled slowly to room temp. The seams were resistant to corrosion under operating conditions of digesting cellulose in a medium containing sodium carbonate 10, sodium hydroxide 80, sodium sulphide 25.3, sodium sulphite 7.1 and sodium sulphate 10 grams per liter. The mechanical properties were satisfactory.—C. J. W.

Process and Apparatus for Producing Pulp. William Brubacher. U. S. pat. 2,008,635 (July 16, 1935).—The invention provides a tall (about 100 ft.) relatively narrow digester, through which the raw material is passed and cooked as a continuous operation. The apparatus, while suitable for alkaline cooking, is more particularly designed for the sulphite process. Supply of chips or other material is effected at the top and is controlled by means of two spaced, differently pitched, independently driven worms, which maintain a substantially air-tight seal. The digester gradually tapers outwardly from the top to a point considerably below the center, and from this point tapers more sharply inward towards the bottom. Cooking liquor is admitted at or near the point of maximum diameter, and cooking is effected by both direct and indirect steaming. A number of heat exchangers are provided to recover heat from the discharged liquor and also from the relieved gases and to heat up the liquor so that it is introduced into the apparatus at or near the boiling point.—A. P.-C.

Method and Apparatus for Fiber Liberation. Lloyd D. Smiley assignor of one-third to Charles D. Altick and one-third to Edward T. Turner. U. S. pat. 2,011,595 (Aug. 20, 1935).—The digester contents are maintained under a constant hydrostatic head whereby the liquor is caused to penetrate the chips. The digester is filled full of material and the level of the cooking liquor is raised above the digester dome, so that there is no space in which gases may rise within the digester. The liquor is circulated under pressure, being withdrawn from the top and reintroduced at the bottom of the digester. After withdrawal from the digester, the pressure on the liquor is temporarily reduced, and the gases thus liberated are returned to the liquor to maintain its strength. Prior to reintroduction into the digester the liquor is reheated either directly or indirectly.—A. P.-C.

Digesting Apparatus. Joaquin Julio de la Roza, Sr., assignor to de la Roza Corp. U. S. pat. 2,011,799 (Aug. 20, 1935).—The invention relates to a volumetric discharge valve for de la Roza's continuous digester, U. S. pats. 1,991,243 to 1,991,245, of Feb. 12, 1935. The valve comprises a rotor containing a number of buckets to receive cooked material and discharge it into a blow pit. A saddle is fitted to ride the rotor and is flexibly supported by means of a diaphragm made of a strong, flexible material such as chrome nickel steel. The construction is such that the saddle is free to move in the direction of flexing of the diaphragm, but cannot move in the plane of the diaphragm. In this way the saddle can move while riding the rotor and maintaining a seal. The diaphragm is placed under a slight tension and acts as a spring forcing the saddle on its seat.—A. P.-C.

New Equipment and Its Uses. R. D. Kehoe. Paper Mill 58, No. 22; 17-19 (June 1, 1935).—A brief outline of the performance and merits of the roller strainer, Laughlin settling tank, pulsometer, Thorsen beater, fibropump, Bertram's improved beater, Banning beater, Precision consistency regulator, and Cowles refiner.—A. P.-C.

Means and Method of Stringing a Foudrinier Wire. Earl E. Berry assignor to Beloit Iron Works. U. S. pat. 2,003,103 (May 28, 1935).—The new wire is suspended in an open loop alongside of the fourdrinier frame structure while the machine is still running, and after the old wire has been removed the fourdrinier frame structure is run out into the loop of the new wire, the latter is tightened and the fourdrinier frame structure is run back into position in the machine.—A. P.-C.

Woven Wire Belt for Paper Making Machines. Harry G. Specht assignor to Eastwood-Nealley Corp. U. S. pats. 2,003,123 and 2,003,124 (May 28, 1935).—*No. 2,003,123*—Warp wires of flat wire having a substantially flat, ribbon-like cross section are woven with shoot or weft wires of circular cross section. The flat shape and relative thinness of the warp permit of beating up to a much finer mesh than heretofore possible with round warp wires of the necessary strength and gauge. *No. 2,003,124*—A twill-weave wire is made with round shoot or wet wire and flat, ribbon-like warp wires.—A. P.-C.

Woven Wire Fabric. Joseph O'Neill. U. S. pat. 2,003,695 (April 11, 1935).—Every sixth warp wire is composed of approximately 96% copper, 1% manganese and 3% silicon, preferably soft-annealed, and the remaining warp wires are of the usual brass or phosphor bronze. This is claimed to give greater strength, with resultant increased wire life.—A. P.-C.

Carbon Tetrachloride for Cleaning Wires and Felts. H. B. Richmond. Paper Industry 17:318 (Aug., 1935).—Carbon tetrachloride is both safer and more efficient than kerosene or gasoline for cleaning paper machine wires and felts.—A. P.-C.

Concerning the History of the Manufacture of Paper Machine Wires. Stefan Wallner. Wochbl. Papierfabr. 66, No. 16: 307-08 (April 20, 1935).—A short description of the more important developments in the manufacture of paper machine wires.—J. F. O.

Device for Automatically Regulating the Course of the Wire on Fourdrinier Paper Machines. Firma J. M. Voith, Heidenheim. Ger. pat. 609,590 (March 14, 1929).—J. F. O.

Functions of Felts. E. A. Rees. Paper Mill 58, No. 21: 15-21 (May 25, 1935).—A discussion of the functions and mechanism of action of press felts in water removal from the sheet, showing that best and most economical results are obtained by a compromise between conflicting qualities.—A. P.-C.

Performance of Suction Felt Rolls. O. C. Cordes. Paper Mill 58, No. 23: 81-82 (June 8, 1935).—An outline of the design, performance and merits of the Downingtown suction felt roll.—A. P.-C.

Drier Felt for Paper Making Machines. Tom Milnes assignor of one-half to Ayers Ltd. U. S. pat. 2,005,979 (June 25, 1935).—Integral interfitting loops are formed in the two ends of the felt by folding and slotting the ends so that the folded portions lie at the inner side of the felt when the two sets of loops are secured together by passing one or more retaining keys through the interfitted loops.—A. P.-C.

Felt Guide Roll. John A. Ziegler. U. S. pat. 2,008,318 (July 16, 1935).—The length of the guide roll proper is exactly equal to the width of the felt. The ends are journalled in rotatable wheels, which ride on rails attached to the sides of the machine frame and which are movable in the direction of travel of the felt. When the latter is displaced sideways, it engages one of the wheels, with the result that one end of the guide-roll is advanced and returns the felt to its normal position.—A. P.-C.

Thermostatic Calender Roll. William P. Boyd. U. S. pat. 2,011,748 (Aug. 20, 1935).—A roll, preferably of heat conducting material, has a normally sealed compartment that is cylindrical and co-axial with the roll. Through an opening which is subsequently sealed, there is introduced a predetermined amount of water or other liquid which is a conductor of electricity while liquid but a non-conductor when converted into vapor. By varying the amount of liquid introduced, the temperature at which it is completely vaporized and breaks the circuit can be regulated, and the device therefore acts as a thermostat and maintains the roll at any desired temperature.—A. P.-C.

Importance of the Calender Stack in Paper Making. E. H. Berges. Paper Mill 58, No. 23: 74-80 (June 8, 1935).—A practical discussion on the precaution required to obtain the best possible calendar performance.—A. P.-C.

Suction Roll and Method of Drilling Same. Albert H. Standley assignor to Downingtown Manufacturing Co. U. S. pat. 2,006,519 (July 2, 1935).—The openings drilled in the suction roll shell are given a circumferential rake, having their outer ends in advance of their inner ends as regards the direction of rotation of the shell.—A. P.-C.

Flat Screen Frame. Joseph J. Moravec. U. S. pat. 2,004,507 (June 11, 1935).—The frame is built in sections, each section comprising a unitary structure (or built of separate parts which, when assembled, constitute unitary sections). All surfaces coming in contact with the screened pulp are of metal. The means provided for locking the screen frame members is housed so as to exclude all pulp.—A. P.-C.

Pulp Screen. Marcel Lamort assignor to Etablissements E. et M. Lamort Fils. U. S. pat 2,002,404 (May 21, 1935).—The screening drum is formed with a zig-zag surface (*e.g.*, shaped like a Chinese lantern or star-shaped) and is mounted in a flat horizontal frame. Suitably shaped plates are mounted between the screening plates and are given an oscillatory movement to produce pulsations in the stock thus inducing or facilitating screening.—A. P.-C.

Pulp Screening Machine. Nelson M. Knight. U. S. pat. 2,003,150 (May 28, 1935).—The screening element consists of a vertical, stationary cylinder with perforated screening side walls with stock inlet at the top and tailings outlet at the bottom, enclosed in a suitable casing. In order to cause the pulp to be forced back and forth through the screening plate during its flow from the inlet to the outlet, fixed horizontal plates are provided inside the screening cylinder, and alternating with the stationary plates are horizontal vibrating plates. To further clean the screen and prevent clogging, a series of adjustable "runners" are passed close to the outer surface of the screen.—A. P.-C.

Centrifugal Pulp Screen in Board Mill. E. J. Trimbey. Paper Industry 17: 253 (July, 1935).—The value of utilizing a pulp mill type of centrifugal screen for intermediate screening in board mills using continuous beaters for working up old paper stock is pointed out.—A. P.-C.

Screen Plate Support. George Clausen. U. S. pat. 2,003,923 (June 4, 1935).—The support consists of a saddle, adapted to hold the edges of the screen plates extending lengthwise and engaging the upper edge of the wooden bar carrying the plates. Spaced yolks engage the lower edge of the bar and are bolted to the saddle.—A. P.-C.

Device for Driving the Oscillating Membrane of Flat Screens. Zellstofffabr. Waldhof, Mannheim. Ger. pat. 610,020 (July 6, 1933).—J. F. O.

Revolving Horizontal Screen for Slushy Flowing Material, Especially for Ground Wood, Pulp and Similar Materials. Zellstofffabrik Waldhof, Mannheim. Ger. pat. 612,842 (May 23, 1933).—J. F. O.

Chip Screening in the Kymmene Pulp Mill. N. Lindblom. Finnish Paper and Timber J. 17, no. 11: 544-546, 548, 550 (June 15, 1935).—The modernization program carried out in the Kymmene (Finland) pulp mill during the past year involved many changes, for instance, the use of Outokumpo pyrites in the place of sulphur. The mill produces a high grade bleached sulphite pulp and receives its wood supply by railroad, i.e., in non-floated condition. Drum barkers are therefore not considered suitable and knife barkers will be employed. An unusual installation is the so-called fractionated chip screening system, which separates the chips into two sections, the so-called "quality chips" of uniform size (about 66-75% of the entire yield) for the production of high grade bleached sulphite pulp and the "paper chips" comprising the smaller chips, knots and saw dust, which are cooked in a separate digester and used in unbleached condition for feeding the mill's newsprint machines. The layout and its advantages are described in detail and supplemented by photos and tables.—C. J. W.

Pulp Controller "Atek." Finish Paper and Timber J. 17, special issue: 272 (April, 1935).—The apparatus permits the control of work performed by different screens by indicating the units which produce impurities or shives.—C. J. W.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JUNE 27, 1936

CIGARETTE PAPER

R. J. Reynolds Tobacco Co., *Washington,* Havre, 225 cs.; Standard Products Corp., *Washington,* Havre, 27 cs.; Champagne Paper Corp., *Paris,* Havre, 633 cs.

WALLPAPER

F. Blank, *Washington,* Hamburg, 14 cs.; ———, *Hamburg,* Hamburg, 1 ble.; Globe Shipping Co., *Hamburg,* Hamburg, 2 bls.; ———, *Columbus,* Bremen, 1 cs.; F. A. Binder, *Columbus,* Bremen, 35 bls., 10 cs.; S. K. Lonegren, *Kungsholm,* Gothenburg, 12 bxs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Banker,* London, 1 cs., 2 bls.

WALLBOARD

Treetex Corp., *Kungsholm,* Gothenburg, 700 bdls.; Treetex Corp., *Teneriffa,* Kopmanholmen, 3,224 bdls.

NEWSPRINT

N. Y. Evening Journal, *Ingola,* Quebec, 5,396 rolls; N. Y. Evening Journal, *Tana,* Quebec, 6,119 rolls; H. Reeve Angel & Co. Inc., *Scanyork,* Kotka, 167 rolls; Lunham & Reeve, *Scanyork,* Kotka, 224 rolls; Jay Madden Corp., *Scanyork,* Kotka, 633 rolls; Jay Madden Corp., *Washington,* Hamburg, 445 rolls; Jay Madden Corp., *Columbus,* Bremen, 140 rolls; Perkins Goodwin & Co., *Columbus,* Bremen, 284 rolls; Perkins Goodwin & Co., *Hamburg,* Hamburg, 250 rolls.

PRINTING PAPER

The Lafayette Co., *Franconia,* Liverpool, 2 cs.; Phoenix Shipping Co., *Hamburg,* Hamburg, 2 cs.

WRAPPING PAPER

Steiner Paper Corp., *Hamburg,* Hamburg, 51 cs.; National Paper & Type Co., *Hamburg,* Hamburg, 25 bls.; Wilkinson Grey & Co., *Kungsholm,* Gothenburg, 69 bls.; Guaranty Trust Co., *Kungsholm,* Gothenburg 349 rolls.

DRAWING PAPER

H. Reeve Angel & Co. Inc., *Britannic,* London, 4 cs.

FILTER COMPOUND

Mager Bros., Inc., *Hamburg,* Hamburg, 75 bls.

FILTER PAPER

H. Reeve Angel & Co. Inc., *Britannic,* London, 19 cs.; ———, *American Banker,* London, 3 cs.

SURFACE COATED PAPER

Gevaert Co. of America, *Pennland,* Antwerp, 20 cs.; Gevaert Co. of America, *Rotterdam,* Rotterdam, 49 cs.

METAL COATED PAPER

K. Pauli Co., *Columbus,* Bremen, 31 cs.; C. H. Forsman Co., *Columbus,* Bremen, 4 cs.

BARYTA COATED PAPER

Globe Shipping Co., *Columbus,* Bremen, 46 crates.

PHOTO PAPER

Medo Photo-Supply Co., *Aquitania,* Southampton, 2 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Franconia,* Liverpool, 31 cs. (duplex).

DECALOMANIAS

Sellers Transportation Co., *Columbus,* Bremen, 10 cs.

TRANSFER PICTURES

Rohner Gehrig & Co., *Columbus,* Bremen, 2 cs.

LITHO PAPER

B. Meiners, Inc., *Nako Maru,* Hong Kong, 10 cs.

COLORED PAPER

International F'd'g. Co., *Hamburg,* Hamburg, 7 cs.

GUMMED PAPER

Salmon Co., *Washington,* Havre, 2 cs.

TISSUE PAPER

W. J. Byrnes, *Queen Mary,* Southampton, 1 cs.; B. F. Drakenfeld & Co., *Franconia,* Liverpool, 1 cs.; ———, *Columbus,* Bremen, 8 cs.; Irving Trust Co., *Hokuroku Maru,* Kobe, 11 cs.

STENCIL PAPER

American Express Co., *American Banker,* London, 1 cs.

ASBESTOS PAPER

U. S. Asbestos Division of Raybestos, *American Banker,* London, 6 bls.

NOTE BOOKS

Keuffel & Esser Co., *Hamburg,* Hamburg, 7 cs.

TRANSPARENT PAPER

———, *Kungsholm,* Gothenburg, 21 cs.

PAPER

Japan Paper Co., *Excambion,* Genoa, 5 cs.; H. Reeve Angel & Co. Inc., *Sonnavind,* Yokohama, 8 cs.; E. Lucarini, *Kirishima Maru,* Yokohama, 10 cs.; Keuffel & Esser Co., *Hamburg,* Hamburg, 25 cs.; ———, *Hamburg,* Hamburg, 451 rolls; Guaranty Trust Co., *Kungsholm,* Gothenburg, 337 rolls; Lunham & Reeve, Inc., *Kungsholm,* Gothenburg, 7 rolls; F. L. Kramer & Co., *Kungsholm,* Gothenburg, 122 rolls; The Borregaard Co. Inc., *Kungsholm,* Gothenburg, 109 bls., 203 rolls, 22 cs.; Japan Paper Co., *Kungsholm,* Gothenburg, 1 cs.; Japan Paper Co., *Niel Maersk,* Kobe, 64 cs.; Selsi Co., *Paris,* Harve, 1 cs.

RAGS, BAGGINGS, ETC.

Castle & Overton, Inc., *McKeesport,* Dundee, 320 bls. paper stock; Manufacturers Trust Co., *McKeesport,* Dundee, 63 bls. paper stock; Irving Trust Co., *Sarcoxie,* Havre, 62 bls. bagging; J. Cohen & Sons, *Sarcoxie,* Havre, 19 bls. rags; Philadelphia National Bank, *Sarcoxie,* Havre, 45 bls. rags; E. J. Keller Co. Inc., *Sarcoxie,* ———, 77 bls. bagging; ———, *Sarcoxie,* Dunkirk, 37 bls. rags, 60 bls. waste; Manufacturers Trust Co., *Habana,* Santander, 28 bls. rags; Myers Lipman Woolstock Co. Inc., *Britannic,* London, 10 bls. rags; ———, *American Banker,* London, 59 bls. old strings; ———, *Tonsbergfjord,* Barcelona, 54 bls. bagging; E. J. Keller Co. Inc., *Rotterdam,* ———, 185 bls. rags; G. W. Millar & Co. Inc., *Rotterdam,* Rotterdam, 119 bls. bagging; E. J. Keller Co. Inc., *Excambion,* ———.

299 bls. paper stock, 207 bls. bagging; W. Steck & Co., *Excambion,* Alexandria, 70 bls. bagging; Castle & Overton, Inc. *Excambion,* Alexandria, 53 bls. rags; S. Birkenstein & Son, *Olympia,* Barcelona, 108 bls. bagging; ———, *Olympia,* Barcelona, 31 bls. bagging; ——— *Olympia,* Valencia, 113 bls. rags; R. Blank, *Olympia,* Valencia, 23 bls. rags; ———, *Olympia,* Alicante, 221 bls. rags; O. Smith & Sons, *Sonnavind,* Kobe, 100 bls. cotton waste; ———, *Sonnavind,* Kobe, 165 bls. cotton waste, 30 bls. rags; S. Shapiro & Son, *Washington,* Hamburg, 56 bls. rags; ———, *Lehigh,* Manchester, 40 bls. cotton waste; ———, *Hamburg,* Hamburg, 61 bls. rags; Union Waste Co., *Columbus,* Bremen, 60 bls. thread waste; Philadelphia National Bank, *Hokuroku Maru,* Shanghai, 234 bls. cotton waste; ———, *Hokuroku Maru,* Kobe, 50 bls. rags; Chase National Bank, *Niel Maersk,* Kobe, 110 bls. rags; E. J. Keller Co. Inc., *Niel Maersk,* ———, 400 bls. bagging; J. Levy & Son, *Oriente,* Havana, 14 bls. rags; Walker Goulard Plehn Co., *Siboney,* Havana, 100 bls. scrap paper.

OLD ROPE

Banco Coml. Italiane Trust Co., *Hamburg,* Hamburg, 97 coils.

CASEIN

———, *Queen Mary,* Southampton, 67 bags; ———, *Sarcoxie,* Havre, 400 bags; ———, Paris, Havre, 333 bags.

WOOD PULP

Lagerloef Trading Co., *Scanyork,* Kotka, 260 bls. sulphate, 52 tons; Lagerloef Trading Co., *Scanyork,* Kotka, 1,375 bls. mechanical pulp, 275 tons; Lagerloef Trading Co., *Scanyork,* Kotka, 326 bls. sulphite, 54 tons; Lagerloef Trading Co., *Scanyork,* Wiborg, 624 bls. sulphate, 104 tons; ———, *Washington,* Hamburg, 181 bls. wood pulp, 19 tons; M. Sone, *Washington,* Hamburg, 500 bls. woodpulp, 79 tons; Gottesman & Co. Inc., *Delaware,* Bamble, 1,800 bls. sulphate, 206 tons; Bank of N. Y. Trust Co., *Hamburg,* Hamburg, 605 bls. wood pulp, 121 tons; Perkins Goodwin & Co., *Kungsholm,* Gothenburg, 1,016 bls. sulphate, 203 tons; E. M. Sergeant Pulp & Chemical Co., *Kungsholm,* Gothenburg, 635 bls. kraft soda; Gottesman & Co. Inc., *Kungsholm,* Gothenburg, 1,800 bls. sulphate; Bulkley Dunton & Co., *New York,* ———, 318 bls. wood pulp; Bulkley Dunton & Co., *Teneriffa,* ———, 3,125 bls. sulphite; Bulkley Dunton & Co., *Teneriffa,* ———, 500 bls. sulphate; Pagel Horton & Co. Inc., *Teneriffa,* Gefle, 250 bls. sulphite, 500 bls. sulphate; Stora Kopparberg Corp., *Teneriffa,* Skutskar, 1,120 bls. dry pulp; Perkins Goodwin & Co., *Teneriffa,* Norrsundet, 1,375 bls. sulphate; Price & Pierce, Ltd., *Teneriffa,* Hernosand, 600 bls. unbleached sulphite, 100 tons; Price & Pierce, Ltd. *Teneriffa,* Hernosand, 160 bls. unbleached mechanical, 25 tons; Perkins Goodwin & Co., *Teneriffa,* Kopmanholmen, 429 bls. chemical pulp.

WOOD PULP BOARDS

G. H. McFadden & Bros., *Blink,* Hamburg, 270 bls., 27 tons; G. H. McFadden & Bro., *Hamburg,* Hamburg, 250 bls., 25 tons; Jay Madden Corp., *Scanyork,* Kotka, 126 bls., 78 rolls; Jay Madden Corp., *Scanyork,* Wiborg, 74 bls.

WOOD PULP PASTEBOARD

———, *Washington,* Hamburg, 53 cases.

WOOD PULP SHEETS

———, *Columbus,* Bremen, 90 bls.

NEWARK IMPORTS

WEEK ENDING JUNE 27, 1936

H. G. Craig Co., *Newscarrier,* Donnacona, 344 rolls newsprint.

ALBANY IMPORTS

WEEK ENDING JUNE 27, 1936

Price & Pierce, Ltd., *Delaware,* Oslo, 300 bls. unbleached sulphite, 50 tons; E. M. Sergeant Pulp & Chemical Co., *Delaware,* Oslo, 450 bls. chemical pulp, 76 tons; Atterbury Bros., Inc., *Delaware,* Oslo, 1,950 bls. sulphite, 330 tons; Atterbury Bros., Inc., *Delaware,* Oslo, 1,000 bls. chemical pulp, 203 tons; The Borregaard Co. Inc., *Delaware,* Sarpsborg, 150 bls. sulphate, 25 tons; Gottesman & Co. Inc., *Teneriffa,* Gefle, 950 bls. sulphite; Pagel Horton & Co. Inc., *Teneriffa,* Gefle, 1,125 bls. sulphite, 520 bls. sulphate; Pagel Horton & Co. Inc., *Teneriffa,* Kopmanholmen, 1,950 bls. sulphite; Perkins Goodwin & Co., *Teneriffa,* Kopmanholmen, 521 bls. chemical pulp; Perkins Goodwin & Co., *Teneriffa,* Norrsundet, 3,500 bls. sulphate; Perkins Goodwin & Co., *Teneriffa,* Hernosand, 1,980 bls. sulphate; J. Andersen & Co., *Teneriffa,* Hernosand, 1,800 bls. sulphate; Stora Kopparberg Corp., *Teneriffa,* Hernosand, 250 bls. dry pulp; Gottesman & Co. Inc., *Teneriffa,* Hernosand, 600 bls. sulphite; Bulkley Dunton & Co., *Teneriffa,* ———, 1,375 bls. sulphite.

BOSTON IMPORTS

WEEK ENDING JUNE 27, 1936

G. F. Malcolm, Inc., *Franconia,* Liverpool, 17 cs. tissue paper; ———, *Franconia,* Liverpool, 122 bags hide cuttings; E. J. Keller Co. Inc., *Excambion,* ———, 285 bls. rags.

PHILADELPHIA IMPORTS

WEEK ENDING JUNE 27, 1936

———, *McKeesport,* London, 130 coils old rope; Lang Co., *McKeesport,* London, 78 bls. paper stock; Philadelphia National Bank, *McKeesport,* Hamburg, 37 bls. rags; F. Weber Co., *McKeesport,* Hamburg, 2 cs. drawing paper; ———, *McKeesport,* Hamburg, 328 rolls, 8 bls. wrapping paper; E. J. Keller Co. Inc., *Sarcoxie,* ———, 719 bls. rags; Castle & Overton, Inc., *Sarcoxie,* Havre, 93 bls. rags; ———, *Sarcoxie,* Havre, 154 bls. rags; E. J. Keller Co. Inc., *Tonsbergfjord,* ———, 223 bls. rags; Lagerloef Trading Co., *Scanyork,* Kotka, 780 bls. mechanical pulp, 156 tons; J. W. Hampton, Jr. Co., *Scanyork,* Kotka, 529 rolls newsprint; Lagerloef Trading Co., *Scanyork,* Wiborg, 254 bls. sulphite, 48 tons; Jay Madden Corp., *Scanyork,* Wiborg, 30 bls. pulp boards, 5 tons; ———, *Sonnavind,* Kobe, 191 bls. rags; Atterbury Bros., Inc., *Delaware,* Oslo, 2,895 bls. sulphite, 493 tons; Atterbury Bros., Inc., *Delaware,* Oslo, 300 bls. chemical pulp, 50 tons; Chase National Bank, *Lehigh,* Glasgow, 127 bls. dark cottons; ———, *Niel Maersk,* Kobe, 167 bls. rags; Bulkley Dunton & Co., *Sandhamn,* ———, 1,000 bls. wood pulp.

CAMDEN IMPORTS

WEEK ENDING JUNE 27, 1936

Lagerloef Trading Co., *Scanyork,* Wiborg, 7,436 bls. sulphate, 1,375 tons; Pagel Horton & Co. Inc., *Simon von Utrecht,* Sweden, 1,500 bls. sulphate.

BALTIMORE IMPORTS

WEEK ENDING JUNE 27, 1936

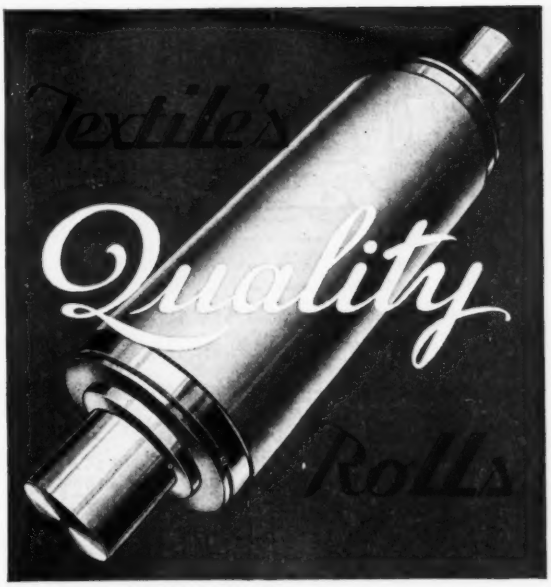
S. Shapiro & Sons, *Kirishima Maru,* Kobe, 167 bls. rags; Pagel Horton & Co. Inc., *Teneriffa,* Skutskar, 1,382 bls. sulphate; Pagel Horton & Co. Inc., *Teneriffa,* Skutskar, 2,400 bls. sulphite; ———, *Tereniffa,* Skutskar, 61 bls. chemical pulp; Price & Pierce, Ltd., *Teneriffa,* Hernosand, 600 bls. unbleached kraft, 100 tons; Price & Pierce, Ltd., *Teneriffa,* Hernosand, 1,500 bls. unbleached mechanical pulp, 250 tons; Gottesman & Co. Inc., *Teneriffa,* Hernosand, 2,500 bls. sulphite; Gottesman & Co. Inc., *Teneriffa,* Gefle, 1,000 bls. sulphite; ———, *Teneriffa* Gefle, 875 bls. sulphite; Stora Kopparberg Corp.,

(Continued on page 132)

WOOD PULP
AGENTS

PRICE & PIERCE, Ltd.,

60 EAST 42nd ST.
NEW YORK



70 YEARS' EXPERIENCE IN CALENDER ROLL MANUFACTURING FOR THE PAPER TRADE. COTTON AND PAPER ROLLS, NEW AND REFILLED

The Textile-Finishing Machinery Co.
New York Office
50 Church St.
Southern Office
Johnston Bldg., Charlotte, N. C.
Providence, R. I.

EXCELSIOR FELTS
a product of
THE
KNOX WOOLEN CO.
CAMDEN MAINE
DISTRIBUTED
SINCE 1864 BY
BULKLEY, DUNTON & CO.
295 MADISON AVE. NEW YORK, N.Y.
CAledonia 5-5260 to 69

Sulphur
A FIRST REQUISITE
in
Paper Making
Large Production
Ample Reserves
Prompt Deliveries
Purity 99½%
TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Gulf, Newgulf and Long Point, Texas

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, July 1, 1936.

Trading in the local paper market continues moderately active. Demand for the various standard grades of paper is considered satisfactory for the season. Sales forces of the leading paper organizations are generally optimistic over the future. Prices, in most instances, are steady to firm.

The newsprint paper market is displaying strength. Demand from the publishers in the leading cities is excellent for the fime of year. Manufacturing operations are proceeding in ample volume to take care of current requirements, although stocks at the mills are not excessive. The price situation is improving.

No further changes have been reported in the fine paper market. Demand for book, cover, bond and ledger papers is well sustained. Tissues continue to move in good volume. The coarse paper market is exhibiting a strong undertone. Demand for summer specialties is expanding. The paper board market is seasonally quiet.

Mechanical Pulp

The ground wood pulp market is rather dull at present. Production in the United States, Canada and abroad is practically keyed to consumption, assuring a normal statistical position. Contract shipments are going forward with fair regularity. Prices are holding to formerly quoted levels.

Chemical Pulp

Steadiness prevails in the chemical pulp market. With heavy arrivals from abroad the contract movement is brisk. Quotations on bleached sulphite pulp and kraft pulp continue very firm. Bleachable grades of unbleached sulphite are stronger. Other grades of chemical pulp rule steady and unchanged.

Old Rope and Bagging

The old rope market is listless. Paper mill demand for domestic and foreign old manila rope is restricted. Mixed strings are moving slowly. The price situation is little changed. Demand for bagging is light. Both scrap and gunny bagging are spotty. Roofing bagging is irregular.

Rags

Quietness prevails in the domestic rag market. New cotton rags are attracting little paper mill interest. Even No. 1 white shirt cuttings are easier. Roofing grades are softer than of late. The imported rag market is dull with quotations on most grades strictly nominal.

Waste Paper

The local paper stock market is practically featureless. Board mill demand for the lower grades is light, although prices are fairly steady. In some quarters, trading is expected to be livelier following the Independence Day holiday. The higher grades of waste paper are fairly active. Quotations, however, are spotty.

Twine

Most of the business transacted in the local twine market during the past week was along routine lines, although demand for the various varieties is above the average for this time of year. More livelier trading is confidently anticipated in the near future. Prices are fairly steady, despite the usual keen competition for desirable orders.

IMPORTS OF PAPER AND PAPER STOCK

(Continued from page 130)

Teneriffa, Gefle, 1,410 bls. dry pulp; Bulkley Dunton & Co., *Sandhamm,* ———, 10,750 bls. wood pulp.

NEWPORT NEWS IMPORTS

WEEK ENDING JUNE 27, 1936

Atterbury Bros., Inc., *Delaware,* Oslo, 450 bls. sulphite, 76 tons; The Borregaard Co. Inc., *Delaware,* Sarpsborg, 2,400 bls. unbleached pulp, 406 tons; Bulkley Dunton & Co., *Teneriffa,* ———, 1,500 bls. sulphate; ———, *Teneriffa,* Hernosand, 1,224 bls. chemical pulp; Gottesman & Co. Inc., *Teneriffa,* Hernosand, 150 bls. sulphite; Price & Pierce, Ltd., *Teneriffa,* Hernosand, 6,720 bls. unbleached sulphite, 965 tons; Stora Kopparberg Corp., *Teneriffa,* Skutskar, 795 bls. dry pulp.

NORFOLK IMPORTS

WEEK ENDING JUNE 27, 1936

Darmstadt Scott & Courtney, *Niel Maersk,* Kobe, 800 bls. bagging.

NEW ORLEANS IMPORTS

WEEK ENDING JUNE 27, 1936

Pagel Horton & Co. Inc., *Ragnhildsholm,* Sweden, 2,483 bls. sulphite; Gottesman & Co. Inc., *Ragnhildsholm,* Finland, 810 bls. wood pulp.

LOS ANGELES IMPORTS

WEEK ENDING JUNE 27, 1936

Frazar & Co., *Sonnavind,* Kobe, 250 bls. rags; Loumar Textile By-Products Co., *Nako Maru,* Kobe, 200 bls. bagging; ———, *Hokuroku Maru,* Shanghai, 241 bls. rags; New Fashion Importing Co., *Hokuroku Maru,* Yokohama, 35 cs. transparent paper.

MONTREAL IMPORTS

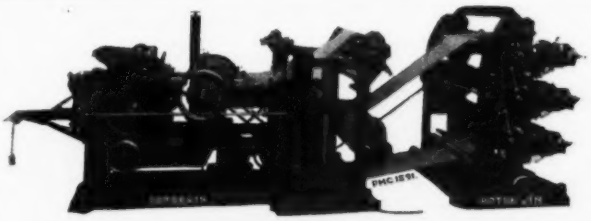
WEEK ENDING JUNE 27, 1936

Gottesman & Co. Inc., *Bretagne,* Sweden, 3,000 bls. wood pulp; Gottesman & Co. Inc., *Trolleholm,* Finland, 1,500 bls. wood pulp.

A. F. Richter Sees Improvement in Europe

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., June 29, 1936—Augustus F. Richter, consulting engineer of the Stebbins Engineering and Manufacturing Company, has returned from a trip to Europe. He was gone several weeks. He reports that in general economic conditions in Europe are good and that the countries there have undergone a stabilizing change. He said also that they seem to have the unemployment problem licked to a great extent.



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NOTION BAG MACHINE

MOST EFFICIENT

OVER 850 BAGS PER MINUTE
PRODUCES BOTH FLAT & SQUARE BAGS
FULL RANGE OF 6 STANDARD NOTION BAGS
HANDLES KRAFT, GLASSINE, BOND & SULPHITE

ALSO MAKERS OF WAXERS & PRESSES

POTDEVIN MACHINE CO.
1223 38TH ST. BROOKLYN, N. Y.
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We make and stock them for every known trade name and size Jordans.

We also make and stock the old type Fillings.

Your inquiries and orders will have the prompt attention of the undersigned. We are the only makers of:

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THE BAHR BROTHERS MFG. CO.
Marion, Indiana, U. S. A.

HIGHEST GRADE
CLAYS

PAPER MAKERS IMPORTING CO. INC. EASTON, PENNSYLVANIA U.S.A.

COATING FILLING
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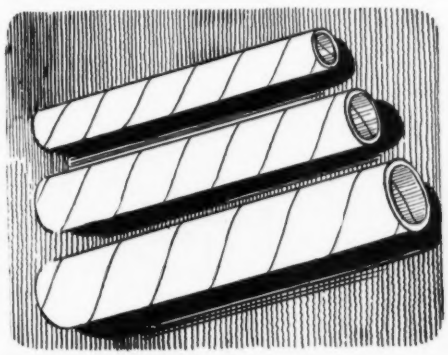

We specialize in Spiral cores for paper mill requirements, made of Chip, Chestnut, Fibre, Manila, Straw and Screenings, reinforced inside and out with Jute or Test Liner. All lengths, Diameter up to 14 inches, Maximum wall thickness 5/8 inches.

Our Product by actual test conducted in the laboratories of the Massachusetts Institute of Technology discloses a working strength equal to and in excess of the straight wound type of core. We invite your inquiries and will gladly submit samples and prices on application.

WALKER GOULARD PLEHN COMPANY, INC.
(Successors to Maurice O'Meara Co.) Established 1855
448 - 450 Pearl Street
NEW YORK CITY NEW YORK

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, July 1, 1936.

BLANC FIXE.—Trading in the blanc fixe market is moderately active. The contract movement is seasonal. Prices are steady. The pulp is quoted at $42.50 to $45 per ton, in bulk; while the powder is selling at 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDERS.—The position of the bleaching powder market is unchanged. Shipments against contract are going forward at a steady pace. Prices are holding to schedule. Bleaching powder is quoted at $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN.—The casein market is fairly steady. Domestic standard ground is quoted at 15 and finely ground at 15½ cents; while French and Argentine standard ground are selling at 15¼ and finely ground at 15½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Paper mill demand for caustic soda is persistent. Contract shipments are moving regularly. Solid caustic soda is quoted at $2.55 to $2.60; while the flake and ground are selling at $2.95 to $3 per 100 pounds, in drums, at works.

CHINA CLAY.—The china clay market is fairly active. The movement of supplies into consumption is normal. Imported china clay is still quoted at $13.50 to $21 per ton, ship side; while domestic paper making clay is selling at $6.50 to $12 per ton, at mine.

CHLORINE.—Steadiness prevails in the chlorine market. Contract shipments are moving freely, considering the time of year. Prices are holding to formerly quoted levels. Chlorine is quoted at $2.15 to $2.55 per 100 pounds, in tank cars, at works.

ROSIN.—The rosin market is easier. Paper making gum rosin is now quoted at $4.60 and wood rosin at $4.70 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $2.60 per 100 pounds, in tank cars, at works.

SALT CAKE.—Demand for salt cake from the paper mills is well sustained. The contract movement is average. Salt cake is quoted at $12 to $13; chrome salt cake at $11 to $12 per ton, at works. Imported salt cake is selling at $12 to $13 per ton, ship side.

SODA ASH.—The soda ash market continues to display strength. Shipments against contract are moving in good volume. Prices are steady. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH.—Conditions in the starch market are fairly satisfactory. The contract movement is normal for the season. Prices remain unchanged. Special paper making starch is quoted at $3.20 per 100 pounds, in bags, and at $3.47 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Business in the sulphate of alumina market is mainly routine. Prices are holding to schedule. Commercial grades are quoted at $1.35 to $1.60; while iron free is selling at $2 to $2.25 per 100 pounds, in bags, at works.

SULPHUR.—The sulphur market continues steady. Yearly contracts are quoted at $18 per ton, on orders of 1,000 tons, or over and $20 on smaller quantities. On spot and nearby car loads the quotation is $21 per ton. All quotations are in car lots, at works.

TALC.—No radical changes were reported in the talc market during the past week. Prices are maintained at formerly quoted levels. Domestic talc is selling at $16 to $18 per ton, at eastern mines; while imported talc is quoted at $23 to $30 per ton, on dock.

Market Quotations

Paper

Rag Content Bond & Ledgers—Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—Delivered Zone 1

	Bonds		Ledgers
No. 1 Sulphite	7.50	@	8.50
No. 2 Sulphite	6.50	@	7.50
No. 3 Sulphite	6.00		7.00
No. 4 Sulphite	5.50		6.50
Book, B Grade, Cased			
S. & S. C.	5.85	@	6.60
S. & S. C. Litho.	6.10	@	6.85
M. F.	5.60	@	6.35
No. 4 Grade			
Coated and Enamel	6.80	@	7.65
Coated Litho	6.80	@	7.65
Tissues—Per Ream—			
White No. 1	.82½	@	—
White No. 1 M. G.	.77½	@	—
White No. 1½	.62½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.67½	@	—
Colored	.80	@	—
Kraft	.67½	@	—
Manila	.60	@	—
Unbleached Toilet	2.60	@	3.30
Bleached Toilet	3.94	@	5.26
Paper Towels—			
Unbleached	2.10	@	3.35
Bleached	3.30	@	3.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75

(Delivered New York)

News, per ton—			
Roll, contract	41.00	@	—
Sheets	46.00	@	—
Kraft—			
No. 1 Northern	4.25	@	4.75
Standard	4.12½	@	—
Southern	4.00	@	—
Boards—per ton—			
News	32.50	@	35.00
Chip	32.50	@	35.00
Sgl. Mla. Ll. Chip	45.00	@	47.50
Jute Lined Chip	42.50	@	45.00
Kraft Liners	60.00	@	62.50
White Pat. Coated	55.00	@	57.50
Binders Boards	67.00	@	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—		
Moist	24.00	@25.00
Dry	24.00	@25.00
(Delivered)		
No. 1 Domestic and Canadian	27.00	@28.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Division 1	2.70	@	3.10
Division 2	2.65	@	2.75
Division 3	2.60	@	2.70
Prime Qualities—			
Class 1. All Prime Easy Bleaching	2.05	@	2.10
Other Than Easy Bleaching—			
Class 2. Higher than Standard	2.00	@	2.05
Class 3, Standard	1.95	@	2.00
Class 4. Lower than Standard	1.90	@	1.95
(On Dock, Atlantic Ports)			
Kraft Bleached	3.00	@	3.25
Kraft No. 1	1.85	@	2.00
Kraft No. 2	1.70	@	1.80
(F. o. b. Pulp Mill)			
Kraft Domestic	1.80	@	2.00
(Delivered)			
Soda Bleached	2.60	@	—

* Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.50	@	8.00
Silesias No. 1	5.50	@	5.75
New Unbleached	8.25	@	8.50
New Soft Blacks	3.75	@	4.00
Blue Overall	5.75	@	6.00
Fancy	3.25	@	3.50
Washables	2.25	@	2.50
Mixed Khaki Cuttings	3.50	@	3.75
O. D. Khaki Cuttings	4.25	@	4.50
Men's Corduroy	2.00	@	2.25
New Mixed Blacks	2.75	@	3.00

Old Rags

White, No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.75	@	3.25
White, No. 2—			
Repacked	1.75	@	2.25
Miscellaneous	1.50	@	1.75
Thirds and Blues—			
Repacked	2.25	@	2.50
Miscellaneous	2.10	@	2.20
Roofing Rags—			
No. 1	1.80	@	1.85
No. 2	1.35	@	1.40
No. 3 (bagging)	1.20	@	1.30
No. 4	1.20	@	1.30
No. 5A	.90	@	1.00

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.50
New Mixed Cuttings	2.00	@	2.25
New Light Silesias	4.50	@	5.00
Light Flannelettes	4.50	@	5.00
New White Cuttings	7.00	@	7.50
New Light Oxfords	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	2.25	@	2.50
French Blue Linens	3.50	@	4.00
German Blue Linens	2.50	@	2.75
German Blue Cottons	2.00	@	2.25
Checks and Blues	2.00	@	2.25
Linsey Garments	2.15	@	2.25
Dark Cottons	1.90	@	2.10
Old Shopperies	1.75	@	2.00
New Shopperies	1.75	@	2.00
French Blues	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.10	@	2.15
Domestic	1.90	@	2.00
Wool Tares, light	1.50	@	1.75
Wool Tares, heavy	1.85	@	2.05
Bright Bagging	1.75	@	1.80
Manila Rope—			
Foreign	2.35	@	2.45
Domestic	2.25	@	2.35
Mixed Strings	1.10	@	1.15
New Burlap Cut	2.50	@	2.75
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.55	@	2.65
Ordinary Hard White No. 1	2.25	@	2.35
Hard White No. 2	2.10	@	2.20
Soft White No. 1	1.95	@	2.05
Flat Stock—			
Stitchless	.65	@	.75
Over issue Mag	.65	@	.75
Solid Flat Book	.55	@	.60
Crumpled No. 1	.35	@	.40
Solid Book Ledger	1.50	@	1.65
Ledger Stock	.85	@	.90
New B. B. Chips	.30	@	.35
Manilas—			
New Env. Cut	1.75	@	1.85
New Cuttings	1.35	@	1.45
Bogus Wrapper	.40	@	.50
Old Kraft Machine—			
Compressed bales	1.05	@	1.30
News—			
No. 1 White News	1.15	@	1.25
Strictly Overissue	.50	@	.60
Strictly Folded	.30	@	.35
No. 1 Mixed Paper	.22½	@	.27½

REDWOOD PIPE LASTS LONG AND SAVES MONEY

it has 14% greater carrying capacity than metal pipe. Resists Frost where severe winters raise havoc with metal pipe. Does not fill up with vegetable matter nor corrode; does not Scale or Pit; is immune to Electrolysis; weighs about 1/3 as much as metal pipe and more easily installed. Wyckoff Redwood Pipe, made of all Clear Heart Stock Redwood Lumber, made in sizes of one inch and up, maximum lengths 12 feet, for pressures to 172 pounds, is used extensively for Water Supply Lines, Penstocks, Sewage Lines, Chemicals, Paper Mills, Tanneries, Fisheries, Mines, and Fume Stacks. We can furnish selected Canadian White Pine or Oregon Fir Wood Pipe if specified. We also manufacture underground Wooden Steam Pipe Covering. Carload shipments can be made one day after receipt order.

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Magnus SLIME REMOVER

"Now, it takes only 5 minutes to break in a felt!"

That's what one superintendent told us after a year's use of Magnus FELTEX.

He said, "It used to take us five to ten hours to break in a felt. Now, with only one application of FELTEX the new felts function perfectly in five minutes. Our men insist on using FELTEX."

Write today for full details about felt cleaning with Magnus FELTEX.

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Magnus CLEANERS

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SCREENS for PAPER and PULP MILLS

PERFORMANCE of your Centrifugals, Shakers and Drainers definitely improved by the use of precision screens built to your specifications. Let us "sit in" on your screening problems.

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LANGSTON SLITTERS

Improve the quality of your product by using Langston Shear-Cut Slitters which slice the paper cleanly from start to finish of the roll.

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Longerimp, Spiral Weave
Modified Longerimp
Duo-Wear and Regular Weave

They are all "Live Wires"

THE LINDSAY WIRE WEAVING COMPANY
14025 Aspinwall Ave., Cleveland, Ohio

Twines

(F. o. b. Mill)

(Soft Fibre)

Coarse Polished—

India	.13¼	@	.15¾
Belg. White Hemp	.14¼	@	.17¾
India Compress	.13¾	@	.14¼

Fine Polished—

Fine India	.21½	@	.23½
Special	.19½	@	.21½

Unpolished—

Box	.12	@	.12½
Paper Makers	.09	@	.13½
Tube Rope	.10	@	.15½
Wall Paper	.11	@	.14½
Wrapping	.15½	@	.21
Special	.15	@	.15½
Soft Fiber Rope	.12½	@	.12¾

(Hard Fibre)

Bond	.09½	@	.18
Anchor	.09	@	.10½
Manila	.21	@	.28

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.40
Water Marked Sulphite Bond	.06¼	@	.11
Sulphite Bond	.05½	@	.07¼
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¾
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	42.00	@	—
Sheets, open	47.00	@	—
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—

Container Lined—

85 Test, per 1000 sq. ft.	1.70		
100 Test, per 1000 sq. ft.	1.85		

Old Papers

(F. o. b. Chicago)

Shavings—

No. 1 White Envelope Cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.60	@	.70
Solid Books	.50	@	.60
Blanks	1.00	@	1.05
Krafts	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45

Old Newspapers—

No. 1 Folded News	.42½	@	.45
No. 1 Mixed Paper	.25	@	.30

Roofing Stocks—

No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, M. F.	5.00	@	—
Book, S. S. & C.	5.25	@	—
Book, Coated	6.15	@	—
Coated Lithograph	6.15	@	—
No. 1 Jute Manila	10.50	@	—
Manila Sul., No. 1	6.75	@	—
Manila No. 2	4.25	@	—
No. 1 Kraft	6.00	@	—
Southern Kraft	5.00	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.08	@	.08½
New White, No. 2	.04½	@	.05
Light Silesias	.05½		—
Silesias, No. 1	.04½	@	.05
Black Silesias, soft	.03½	@	.04
New Unbleached	.06	@	—
Washable, No. 1	.02	@	.02½
Blue Overall	.06	@	.06½
Cottons—According to grades—			
Washable, No. 2	.02½	@	.04½
New Blue	.01¾	@	.02¼
Fancy	.03	@	—
New Black Soft	.04	@	.04½
New Light Seconds	.03½	@	.04
New Dark Seconds	1.75	@	2.00
Khaki Cuttings—			
No. 1 O. D.	.04	@	.04½
No. 2 Mixed	.03½	@	.04
Corduroy	.02	@	.02¼
New Canvas	.04	@	.04½
New Black Mixed	.02	@	.02¼

Domestic Rags (Old)

White No. 1—			
Repacked	4.00	@	4.50
Miscellaneous	3.00	@	3.50
Thirds and Blues—			
Miscellaneous	2.00	@	—
Repacked	2.25	@	2.50
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	2.20	@	2.25
Domestic No. 1	1.80	@	1.85
Domestic No. 2	1.60	@	1.65
Roofing bagging	1.30	@	—

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	2.00	@	—
Domestic	2.25	@	—
Manila Rope	2.25	@	2.50
Sisal Rope	2.00	@	2.25
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	2.00	@	2.50
No. 2	.90	@	1.00
Wool Tares, heavy	3.00	@	3.25
Mixed Strings	1.00	@	1.10
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.50	@	2.75

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.40
No. 2 Hard White	2.10	@	2.20
No. 1 Soft White	1.80	@	1.85
No. 2 Soft White	1.40	@	1.45
No. 1 Mixed	—	@	.85
Solid Ledger Stock	1.50	@	1.60
Ledger Stock, white	1.15	@	1.20
Ledger Stock, colored	.85	@	.90
No. 1 Books, heavy	.65	@	.70
Manila Cuttings	1.50	@	1.60
Print Manila	.50	@	.60
Container Manila	.50	@	.60
Kraft Paper	1.10	@	1.20
No. 1 Mixed Paper	.35	@	.40
Straw Board Chip	.40	@	—
Binders Board Chip	.40	@	—
Corrugated Board	.60	@	.65
Overissue News	.60	@	—
Old Newspapers	.40	@	—

BOSTON

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.50	8.50
No. 2 Sulphite	6.50	7.50
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¼	@	—
No. 2 Kraft	.04½	@	—

(Delivered New England points)

Southern Kraft	.04	@	—
News Print Rolls	39.50	@	—
Straw Board, rolls	.009	@	35.00
Filled News Board	40.00	@	45.00
Chip Board	37.50	@	40.00
Single Manila Lined Chip	47.50	@	52.50
Single White, Patent Coated News Board (Bender)	55.00	@	65.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	67.00	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.00	@	2.10
No. 1 Soft White	1.75	@	1.85
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.50	@	1.75
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.60	@	.70
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.50	@	1.60
No. 1 Old Manila	.60	@	.65
White Blank News	1.20	@	1.25
No. 1 Kraft	1.05	@	1.12½
Mixed Papers	.22½	@	.25
Print Manila	.47½	@	.50
Container Manilas	.27½	@	—
Old Newspapers	.25	@	.27½
Overissue News	—	@	.40
Box Board Chips	—	@	.25
Corrugated Boxes	.35	@	.37½
Kraft corrugated boxes	.95	@	1.00
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.35	@	2.45
Domestic	2.25	@	—
Transmission Rope	1.20	@	1.30
Jute Rope	1.90	@	2.10
Jute Carpet Threads	1.00	@	1.10
Gunny No. 1—			
Foreign	1.90	@	2.00
Domestic	1.80	@	1.90
Bleachery Burlap	4.50	@	5.00
Scrap Burlap—			
Foreign	2.00	@	2.10
Domestic	1.75	@	1.85
Scrap Sisal	1.90	@	2.00
Scrap Sisal for Shredding	2.10	@	2.25
Wool Tares, heavy	1.90	@	2.00
New Burlap Cuttings	2.00	@	2.25
Australian Wool Pouches	2.25	@	2.50
Heavy Baling Bagging	1.75	@	2.10
Paper Mill Bagging	1.65	@	1.70
Bagging No. 2	1.10	@	1.25

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.01¾	@	.02
New White No. 1	.07½	@	.07¾
New White No. 2	.04	@	.04½
Silesias No. 1	.05	@	.05½
New Black Silesias	.03½	@	.04¼
Soft Unbleached	.07¼	@	.07¾
Blue Cheviot	5.50	@	6.00
Fancy	.02½	@	.02¾
Washable	.0165	@	.0170
Cottons—According to grades—			
Blue Overalls	5.00	@	5.50
New Black, soft	.04	@	.04¾
Khaki Cuttings	.04	@	.04¾
O. D. Khaki	.03¾	@	.04¼
Corduroy	.01¾	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	—	@	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.50	@	1.65
No. 2	1.30	@	1.35
No. 3	1.10	@	1.25

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.50	@	1.70
New White Shirt Cuttings	6.50	@	6.75
Dutch Blues	2.25	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.75	@	1.90
Old Linsey Garments	1.75	@	2.00
New Silesias	5.00	@	5.75

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.11	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.12	@	—
No. 2 Colored	.09	@	—
Ledgers			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.50	@	—
No. 2 M. F. (Carloads)	6.00	@	—
No. 3 M. F. (Carloads)	6.00	@	—
No. 1 S. C. (Carloads)	7.00	@	—
No. 2 S. C. (Carloads)	6.50	@	—
No. 3 S. C. (Carloads)	6.50	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	4.80	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft, No. 2	5.40	@	—

(F. o. b. Cars Toronto)

News, per ton—			
Rolls (contract)	40.50	@	—
Sheets	45.00	@	—

Pulp

Ground wood	27.00	@	—
Unbleached Sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.25
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.40
Printed Manilas	.50	@	—
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.55	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.07½	@	.07¾
Fancy Shirt Cuttings	.02¼	@	.03